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ABSTRACT

In this volume, five working papers are presented. "Accessing Contexts with Intonation" (Thorstein Fretheim) discusses the use of intonation as a tool for understanding the context of an utterance, particularly in combination with reference. Examples are offered in Norwegian. In "'Altsa' and 'Nemlig': Two Views of Causality" (Ildiko Vasko), some functions of two Norwegian particles are discussed and it is proposed that, as modal particles, they point to a cause-effect relationship between propositions. "A Few Notes on Anatomy and Distinctive Features in NTS Handshapes" (Irene Greftegreff) suggests changes in current terminology concerning the Norwegian sign language system, based on general phonological and anatomical usage. "A Note of Ternary Stress in Sentani" (Curtis Rice) argues that this stress system in the Sentani language shows a pattern that is derived with a specific foot type. "A Dependency Phonology Analysis of Some Aspects of the Saami Language" (Lisa An Work) argues for a reduction in the phonological rules of one dialect of the Lappish language. The essay includes a phonemic inventory of the dialect. Each paper contains references. (MSE)

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UNIVERSITY OF TRONDHEIM

WORKING PAPERS IN LINGUISTICS

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ACCESSING CONTEXTS WITH INTONATION

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1 Introduction

This paper is divided into four parts. The introductory section is quite substantial. Part 1.1 gives an outline of the context notion and the explicature-implicature distinction, as explicated in publications on 'relevance theory' (e.g. Sperber and Wilson 1986, Wilson and Sperber 1990, Carston 1988, Blass 1990, and Blakemore 1992) (1.1). Part 1.2 is a brief discussion of the relations between referring expressions, on the one hand, and the relative salience of discourse entities referred to and their assumed degree of accessibility, on the other hand. Particular reference is here made to the theories of Mira Ariel (1985, 1988, 1990, 1991) and Jeanette Gundel et al. (1988, 1989, 1990, in press). A brief account of Norwegian intonation is also included in this introductory section (1.3), as Norwegian intonation will figure prominently in all ensuing sections of the paper.

Section 2 offers a detailed description of a communicative event in which an addressee fails to access the correct context, because his own representation of the world is not consistent with the way the speaker has shaped her utterance. The intonation employed by the speaker causes the addressee to realize that he does not possess the extralinguistic knowledge which it takes to comprehend the interlocutor's communicative act. A metacommunicative aside is then required in order for the addressee's context to be changed so as to match the speaker's.

Section 3 deals with the role of intonation as an explicature-generating linguistic tool. I am going to show how phrase-accentual attenuation of an embedded clause (in our case a relative clause) makes a Norwegian addressee access, with minimal processing cost, a specific context-dependent explicature which would be completely inaccessible if phrase-accentual focussing of the relative had been employed instead of attenuation.

Finally, section 4 looks at the interdependence of reference accessibility and context accessibility. On the basis of data from spoken Norwegian I am arguing that the relative ease with which we are able to access the intended referents of pronouns sometimes depends on our ability to access a relevant *context* for the utterance containing the pronoun.

1.1 *Choosing contexts*

Context has been understood, and defined in a variety of ways in recent linguistic literature. Leech (1983, *inter alia*) considers context to be "any background knowledge assumed to be shared by *s* and *h* and which contributes to *h*'s interpretation of what *s* means by a given utterance" (Leech, 1983:13). Contra this view I consider contexts to be only partially shared by the parties to a conversation. Sperber and Wilson (1986) view

context as something that interactants in a conversation have to actively select in a comprehension process that involves the use of linguistic and other perceptual information (the 'input systems' of Fodor 1983) as well as reasoning based on retrieval of encyclopaedic knowledge. Listeners must avail themselves of context not only in order to recover indirectly conveyed utterance meaning but also in order to identify the actual propositional form underlying an utterance.

Relevance theorists distinguish between assumptions that are explicitly communicated ('explicated') and those that are implicitly communicated ('implicated'), and they draw the distinction between explicit and implicit differently than Grice does with his 'saying' vs. 'implicating' distinction (Grice 1989). On Sperber and Wilson's account a fair number of Grice's conversational implicatures are explicatures rather than implicatures. On the other hand, explicatures and implicatures alike are assumed to be accessible only through the drawing of context-based inferences. Explicatures are obtained by "fleshing out a linguistically encoded semantic representation, in other words, by filling in the blueprint delivered by the grammar" (Blakemore 1992:59). Attested misinterpretations indicate that it is not always a straightforward task to access explicatures as intended by the speaker, as in the following self-experienced situation where the Norwegian speaker B fails to access the explicature to be associated with speaker C's elliptical *wh*-question.

(1) A: Mine unger utsetter meg hele tida for sin musikk, enten jeg vil eller ei.
My kids expose me to their kind of music all the time, whether I want to or not

B: Du kunne jo gå til motangrep, vet du. Jég setter for eksempel på Arnold Schönberg på full styrke, jeg -- Eller Mahler. Mahler er effektiv.
You might launch a counter-attack, you know. Í will for example put on Arnold Schönberg at top volume -- Or Mahler. Mahler is effective.

C: Har du mange?
Have you many?

B: Jeg har alle symfoniene.
I have all the symphonies.

Then there was a burst of laughter from A and C, which made B suspect that he had misunderstood C's question. There were several not fully coded explicatures in B's first turn. The verbal context enabled C and A to figure out that the counter-attack was supposed to be against A's children, and the covert complement of the adjective *effektiv* was also recoverable on the basis of the immediate verbal context. C's question was formed as an elliptical interrogative. Omitting the head noun of an NP, as C did, is a sign that the omitted N denotes a highly continuous (topical), and highly

accessible discourse entity. What would be the most accessible entity in (1), 'children' or 'Mahler records'? B opted for the latter, which turned out to be a false step. What C actually wanted to know was how many children B had, but B failed to retrieve that explicature. For B Mahler's music was in focus (in a sense to be defined in 1.2) at the point where B produced his second turn.

Recovering explicatures is a context-sensitive inferential task just like recovering conversational implicatures. Accessing implicatures, however, involves the active use of more than just activated verbal context and perceptual information, it also involves activation of information stored in an individual's memory, and the individual's general knowledge of the world (for a critical view of this relevance-theoretical distinction, see Kandolf in press).

In my opinion one of prosody's most important pragmatic functions is to aid listeners in their search for the context the speaker has intended them to construct in their minds. Intonational form contains various cues used in the process of accessing not only conversational implicatures but also the explicatures of Sperber and Wilson's relevance theory (see section 3 below).

The way we contextualize a given utterance in a given discourse is crucially dependent on the information derivable from the speaker's having combined a specific intonation pattern with a specific syntactic form. The accent parameter (accentuation vs. deaccentuation of linguistic items), which is one important aspect of intonational form, can provide invaluable cues to pronominal anaphor resolution in cases where there is more than one candidate referent. A major claim of the present paper (in section 4) is that an addressee's search for the intended referent of a referring expression will typically go hand in hand with his or her search for the intended context. Assigning a referent to a discourse anaphor is a mental process that is greatly facilitated if the assignment is contextually relevant. According to Sperber and Wilson a given utterance is *relevant* if and only if it has some contextual effects which can be accessed by an addressee without unjustifiable processing efforts (cf. Wilson 1992). Intonation contributes to keeping processing costs down. It contributes to relevance in that way, but it also contributes to relevance by giving listeners access to contextual assumptions which would not otherwise be inferable, like certain bridging assumptions (Clark and Haviland 1977) accounted for in Fretheim (1992a, 1992b, 1992c, in press).

1.2 *Accessibility and salience*

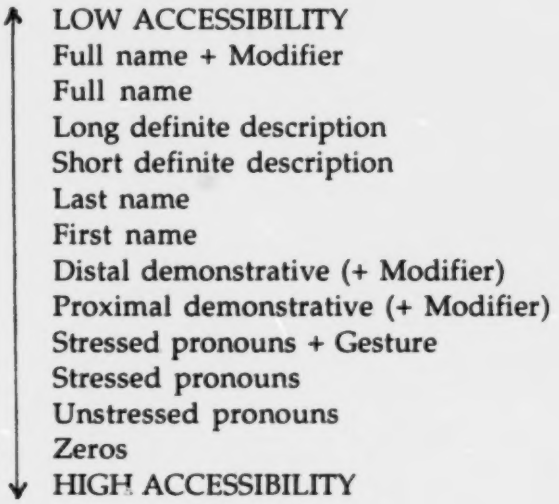
In Ariel's Accessibility theory (Ariel 1988, 1990, 1991) so-called High Accessibility Markers like pronouns and gaps are distinguished from Low Accessibility Markers like definite descriptions on the one hand and proper names on the other, depending on the relative ease with which one can retrieve the intended referent of the marker. High Accessibility Markers imply a minimum of processing effort, while Low Accessibility Markers

imply that their referents are entities currently not highly activated in the discourse, referents whose retrieval may require some memory search. She also posits a third category termed Intermediate Accessibility Markers, which comprises deictics of various sorts.

Stressing a pronoun in an utterance is a signal that the referent of the pronoun is relatively hard to access, Ariel says, and she continues, "Stressed pronouns refer to marked antecedents, i.e. those not automatically accessed under the circumstances. In other words, stressed pronouns refer to referents of Lower Accessibility. They are lower Accessibility Markers" (Ariel 1990:66). My own perspective on these matters differs from Ariel's, as I will demonstrate with particular reference to the stress (or, more accurately, (pitch-)accent) contrast in Norwegian pronouns, in section 4 of this paper.

Ariel's position is that we *code* differences in the degrees of referent or antecedent accessibility by means of the different types of accessibility markers appearing in her hierarchy (2), called the Accessibility scale (taken from Ariel 1991:449).

(2)



Accessibility, for Ariel, is more than a cognitive concept, it is a linguistic feature (Ariel 1991:462).

Ariel uses three criteria which she claims to lie behind the linguistic codification process of the cognitive concept 'degree of Accessibility'.These are 'informativity', 'rigidity', and 'attenuation', "The more informative, the more rigid and the least attenuated the form the lower Accessibility it marks, and vice versa" (Ariel 1991:449). There are some obvious correlations here, I admit, but I believe Ariel's claims to be too strong. Take a fairly informative, rigid, and unattenuated item like a last name, for example. Mention of coreferring formally identical last names in each pair part of an adjacency pair (Sacks et al. 1974) normally does not sound strange at all. Suppose that A's referring expression *Miller* in (3) refers to one

Jonathan Miller, and that the interlocutor B succeeds in accessing the intended referent.

(3) A: Have you been in touch with Miller lately?
B: I bumped into Miller on the pier some days ago.

While A's choice of the term *Miller*, rather than, say, *him*, may well be due to a rather low degree of accessibility of the entity referred to, the referent Miller is clearly optimally salient, and highly accessible, at the point where B is answering A's question, and yet B has taken the liberty to employ the name *Miller*, like an echo of A's identical term.

A consequence of Ariel's position is that the pronoun *he* in (3'), and even the first name *Jonathan* in (3"), signals that the referent is more easily accessible than is the case when the last name *Miller* appears in that anaphoric oblique object slot.

(3') A: Have you been in touch with Miller lately?
B: I bumped into him on the pier some days ago.

(3") A: Have you been in touch with Miller lately?
B: I bumped into Jonathan on the pier some days ago.

Ariel's predictions may work fairly well for spoken monologue and for written texts but they do not seem to give equally good results for conversational data.

Gundel et al.'s theory of the relationship between the assumed cognitive status of entities and the linguistic forms used to code those statuses (Gundel et al. in press) seems to me to avoid the problem I see with Ariel's theory. Gundel et al. (hereafter GHZ = 'Gundel-Hedberg-Zacharski') posit six hierarchically ordered but *implicationally related* cognitive statuses of entities, ordered from most to least 'given', or cognitively salient (cf. also Gundel's and Hedberg's papers in the present panel on accessibility). If an entity is optimally salient, it is said to be 'in focus'. A discourse referent is in focus if it is at the current center of attention of the speech participants, and will "include at least the topic of the preceding utterance, as well as any still-relevant higher-order topics" (Gundel et al. in press, p. 11 in manuscript). Since the cognitive status in focus entails all lower statuses, i.e. 'activated', 'familiar' 'uniquely identifiable', 'referential', and 'type identifiable', in decreasing order of givenness, you may use an unstressed pronoun to refer to the entity in focus but you may alternatively use an expression which would otherwise appropriately code an entity that was familiar but not in focus, nor activated. Since there is nothing in the GHZ framework to prevent a speaker from using a linguistic expression correlated with a cognitive status lower in the hierarchy than the status actually enjoyed by the entity referred to, it is unproblematic for GHZ to reconcile the last name *Miller* in B's turn in (3) with easy referential access.

Conversely, using a demonstrative, for instance, to refer to an entity which is not more than uniquely identifiable will not produce the desired results. Being activated is a necessary and sufficient condition for the appropriate use of a demonstrative, at least in English and some other languages examined by GHZ, so the referent of a demonstrative must be at least activated in order that successful reference assignment be obtained.

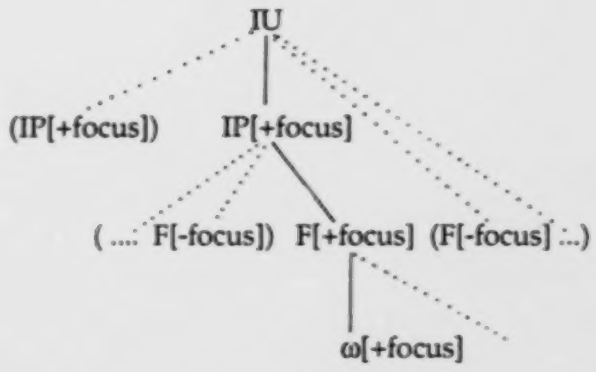
I have restricted my criticism of Ariel which appears at the end of section 4 to her claims that stressed pronouns code a relatively lower degree of referential accessibility than unstressed pronouns, though I believe my criticism to have more general implications for her theory of Accessibility.

1.3 *Norwegian intonation*

The forms and pragmatic functions of Norwegian intonation have been explored in various publications by Fretheim and Nilsen in the framework of the so-called Trondheim model (e.g. Fretheim 1987, 1991, 1992a, 1992b, 1992c, in press, Nilsen 1988,1992). The Trondheim model in its current shape recognizes a number of hierarchically ordered levels of intonational constituent structure, from the intonational utterance (IU) on top to the prosodic word ω at the bottom. The ω is the domain of the Norwegian paradigmatic word-tone, or word-accent opposition, which is, for the kind of East Norwegian spoken in and around Oslo, implemented as a **L*** pitch accent for so-called Accent 1 and a **H*** for the opposite pitch accent, Accent 2 (for the tonal notation, see e.g. Pierrehumbert and Hirschberg 1990). The ω is the obligatory left-edge head constituent of the (tonal) foot (F), which also comprises a right-edge phrasal tone **H**.

The constituent above the F is the intonational phrase (IP), of which there may be either one or two in one IU. There is an indefinite number of F constituents in an IP, the final F being the obligatory head of IP. A special feature of the Trondheim model which is not found in intonational models proposed for other languages is the assumption that the binary feature value [+focus] is inherently attached to the IP node, and is inherited by the head of IP, and by the obligatory ω element heading the IP-final F. Any IP-nonfinal F is [-focus]. (4) indicates how speakers of Norwegian may vary their intonational phrasing. Parentheses and dotted branches mark optional extensions of the IU.

(4)



Phonetically [+focus] is manifested as an elevated phrase-accentual **H** ('focus tone') rising above other **H** tones inside its own IP domain. There may be one or more IP-external F's after the last focus tone. Postfocal IP-external Fs are reserved for phrases designating non-new activated entities.

For each IP in intonational phonology there is a 'focus domain' in the form of a [+focus]-marked node in the corresponding surface-syntactic representation. All and only the intonational nodes marked ω[+focus] are matched by a [+focus]-marked 'focus exponent', which is a terminal node in the syntactic structure enriched with focus specifications. A focus domain is defined as the maximal projection of [+focus] along right-hand branches.

A syntactic focus domain will be assigned one of the two information-structural values 'theme' or 'rheme', according to certain principles of pragmatic interpretation (Fretheim 1992b). When there are two (narrow) foci in a single IU, the distribution of theme and rheme must be inferred on the basis of a variety of factors, such as whether the focused syntactic category is a reasonable theme candidate like an NP, or a very unlikely theme candidate like a V, whether the first focus is initial or noninitial in the sentence, plus various sorts of contextual information about activated and nonactivated entities.

Consider the Norwegian sentence (5), with the two distinct intonational phrasings (5')a (double narrow-focus structure) and b (broad-focus structure) imposed on it. (The focus exponents are indicated by caps, the hierarchical IU structure by labeled parentheses, and word-tone type by a superscript ^{1} or ^{2}.)

(5) Vi skal ha molter til dessert.
We're having cloudberries for dessert

(5') a ((vi skal ha (^{2}MOLTER-til-dess F) IP) ((^{1}ERT F) IP) IU)

b ((vi skal ha (^{2}molter-til-dess F) (^{1}ERT F) IP) IU)

Fundamental frequency trackings of utterances of (5'a) and (5'b) are shown in Figure 1 and Figure 2, respectively.

Figure 1

H* [L] H L* H/H%
((vi skal ha (^{2}MOLTER til dess F) IP) ((^{1}ERT F) IP) IU)

Figure 2

H* [L] H L* H L%
((vi skal ha (2molter til dess F) ((1ERT F) IP) IU)

The tone [L] inserted between the H* of the Accent 2 word *molter* and the phrase-accentual H in both contours has no function other than to separate the F-initial high tone and the F-final high tone, or, if you like, to preserve the Obligatory Contour Principle (OCP) (e.g. Goldsmith 1990). In Figure 1 the focus tone at the end coincides temporally with the high boundary tone H% (the boundary tone notation is due to Pierrehumbert 1980), while Figure 2 ends in a fall to low boundary tone, L%, after the second and final focal maximum.

There is a major information-structural difference between Figure 1 and Figure 2. In the former utterance there are two narrow focus domains, implying that one of them is to be associated with something retrievable from the context of utterance, and the other one with new information. In the latter there is a single IP and therefore a single focus domain, hence no intonationally coded theme, just a rheme. That broad-focus utterance would be felicitous in an 'out-of-the-blue' context: "Guess what! We're having cloudberries for dessert!". The two narrow focus domains in Figure 1 comprise the NP *molter* ("cloudberries") and the PP *til dessert* ("for dessert"), respectively. Both are categories that could serve as utterance themes. If the NP *molter* were the theme constituent, then the speech act would be a statement about cloudberries, "As for CLOUDBERRIES, we're having them/it for DESSERT", but for anyone familiar with Norwegian cuisine that is a weird thing to say, because if you're serving cloudberries, it can only be as a dessert. It should therefore be possible to infer that *for dessert* is the thematic focus domain and that the rheme is the preceding NP.

The set of contexts in which it would be acceptable to use the intonational phrasing of Figure 1 is larger than the set of contexts in which the phrasing shown in (6) would be felicitous.

(6) ((vi skal ha (2MOLTER-til-dess F) IP) (1ert F) IU)

The PP *til dessert* is postfocally 'backgrounded' in (6), meaning that the dessert must be already activated. The added prosodic prominence assigned to the N *dessert* in (5'a) suggests that the sentence-final phrase is likely to designate an entity that has a fairly low cognitive status for the interactants. The topic of discourse is presumably a particular meal that the interactants are going to share but there may have been no mention of desserts. (6) would be infelicitous in that kind of context, because the lack of IU-final

thematic focus is a sign that reference has already been made to the dessert. The rheme-theme structure of Figure 1 would work in either type of context, although the focus tone signaling the IP boundary between NP and PP in Figure 1 would seem to be a redundant intonational feature if the dessert were even the topic of the *previous* utterance in the discourse. Another possibility is that the focal phrase-accent on the PP in Figure 1 is motivated by the speaker's desire to let the utterance end in a **H%** boundary tone, as (East) Norwegian intonation does not allow you to end your utterance on a high pitch level in any other way than through a focal, that is, an IP-final F. **H%** would serve as a sign that an immediate response from the addressee is requested; **L%** would not. Our conclusion must be that intonational focus assigned to a non-new sentence element may be due to the relatively low accessibility of its referent, but it may also be due entirely to the fact that it is impossible to generate an utterance-final rising tune triggered by **H%** without the help of focal phrase-accent.

2 Trying to get the context right

While declarative cleft sentences do not normally permit much prosodic latitude, cleft polar interrogatives come in one of two intonational shapes. The intonational focus may fall either on the final accentable item in the embedded relative following the cleft constituent, or on the cleft constituent itself, depending on whether or not the relative clause is meant to be in the scope of the Q operator.

I know from personal experience that when your interlocutor gives you the interrogative cleft sentence intonation you did not expect, the effect may be truly startling. The communicative event I want to share with you now took place one afternoon last year when I had taken the bus from the university and was walking home from the bus stop. I had been sitting next to a lady on the bus who was unknown to me, and who happened to get off at my bus stop. Crossing the street after leaving the bus she was first just a few yards ahead of me, but I noticed immediately that she was walking much more briskly than I did, and at the point where she by happenstance turned into my street she was already way ahead of me. After a while, however, I noticed a marked deceleration of her tempo and the distance between us diminished very quickly. When I overtook her there on the sidewalk shortly before arriving at my own gate, I felt an urge to say something, as I assumed she would recognize me from the bus, so I said, stupidly:

(7) Du hadde et helt annet tempo i begynnelsen.
You had quite a different tempo in the beginning

First she looked astonished, but then a bright smile lit up her face and she uttered the following interrogative:

(8) Var det du som satt ved siden av meg på bussen?

Was it you who was sitting next to me on the bus?

Now, that question was more or less what I might have expected from her under the circumstances, and also the *it*-cleft form that she gave it, but the intonational phrasing she had chosen confused me. Instead of placing her focal accent on the utterance-final word form *bussen* ("the bus"), as shown in the notation of (9), she placed it on the cleft 2nd person pronoun *du*, as in (10).

(9) ((var det ([1]du-som F) ([1]satt-ved F) ([2]siden-av-meg-på F) ([1]BUSSEN F) IP) IU)
Was it you who was sitting next to me on the BUS?

(10) ((var det ([1]DU F) IP) som ([1]satt-ved F) ([2]siden-av-meg-på F) ([1]bussen F) IU)
Was it YOU who was sitting next to me on the bus?

My interlocutor's intonation made me hesitant. She sounded as if she thought she knew me, but I had no idea who she was. (8) would have been an innocuous question if the sentence were produced with the intonation pattern in (9); it would be a question whether she had correctly recognized me as the man who had been sitting next to her in the bus, but as she produced (10) instead of (9), that was evidently not her illocutionary point. I processed her utterance not as a question but as an exclamatory signal that she had recognized me. When I asked her, hesitantly, if we had met somewhere before, she explained it all to me. We had indeed met before, but up to that point in our encounter her face had not looked familiar to me at all. Nor did she recognize me before I addressed her with that silly remark (7) when I passed her in the street.

The import of the focally accented 2nd person pronoun *du* ("you") in (10), compared to the unfocused *du* in (9), is worthy of attention. If the speaker had produced the utterance type rendered in (9), *du* would be a pronoun essentially void of content. It would simply refer to that person who had stopped walking and was now standing in front of the speaker on the sidewalk. In comparison, the focally accented *du* in (10) - the utterance she did produce - was pregnant with meaning. She knew my name, and she knew a number of other things about me as well. She might as well have said, "I know who you are. You're Thorstein Fretheim, aren't you?". Her context was different from mine. I was certain that I didn't know her, and that she didn't know me; she, on the other hand, believed she knew me.

The intonation imposed on her cleft interrogative caused me to realize that I had to have my context updated. Her intonation left the relative clause outside the focus domain in her utterance. The right-hand IP boundary in the hierarchical intonation structure of Figure 2 restricts the focus to the cleft constituent, which in turn suggests that the clause is outside the scope of the Q operator. Thus she revealed that she had presupposed that the person in front of her was the person who had been

sitting next to her in the bus. The intonational form of her utterance made me access the contextual assumption "She knows me", and I had her confirm my inference by asking the metalinguistic question if she believed we had met before.

As I said, the intonational focus in a declarative cleft sentence will normally be on the cleft phrase. Placing one's focal accent in the relative clause implies a kind of double contrastivity. Its use has a distinctly metalinguistic flavor, as when someone has claimed that Wolf kicked Otis, and someone else is protesting that it was Otis who kicked WOLF. Even though declaratives in general seem to permit a wider range of intonation structures than interrog-atives, at least in Norwegian, intonation in *it*-clefts is a notable exception. The interrogated phrase is just the cleft phrase if there is a narrow intonational focus on that phrase. An utterance-final intonational focus, which is just as normal, implies that the entire sentence construction is interrogated. The interrogative with a narrow cleft focus will, other things being equal, generate a smaller number of contextual assumptions than the cleft end-focus interrogative. Thus, our example (10) with its retracted focal phrase-accent generated more contextual assumptions than the competing intonation structure of (9). In the communicative situation described above, the speaker's use of (10) instead of (9) made me as addressee access the unexpected information that the speaker knew who I was. My verbal as well as nonverbal behavior there on the sidewalk gave my interlocutor access to the assumption that even if she had identified me, I had not identified her. Having processed her utterance (10) and found that it did not mesh with my own set of contextual (background) assumptions, I realized that her context and mine differed because she presumably felt she remembered something from our shared past which had in the meantime been eradicated from my memory, and which could only be retrieved if she gave me some relevant information that might refreshen the kind of frame I had to access to identify her. Her cleft sentence intonation pattern was the triggering device. From the point in our conversation where she had offered me so much information that I could correctly infer where we had met before, what her occupation was, etc., the whole conversation changed its character completely, and we ended up chatting like old friends.

Intonational focus inside or outside a relative clause is going to be a central feature of the next section too, but this time the discourse is contrived, and the relatives are regular restrictives.

3 Accessing explicatures with intonation

In Norwegian, as in a number of other languages, one can predict what kind of intonation structure will be imposed on the second of two identical relative clauses, for example the second instance of the clause *som snakket Bergensdialekt* ("who spoke Bergenese") in (11).

(11) De eneste som var i huset, var en løytnant som snakket Bergensdialekt, og en til som snakket Bergensdialekt, og som tydeligvis var offiser til tross for at han ikke var i uniform.
The only ones present in the house were a lieutenant who spoke Bergenese and another one who spoke Bergenese and who was evidently an officer, in spite of his not wearing a uniform

While there will normally be a focal phrase-accent on the clause-final NP *Bergensdialekt* in the first of the two relatives, the second and syntactically identical relative will contain no intonational focus. Instead the focus in the IU including the second relative will be retracted to the antecedent of the clause. The phrasing employed in that IU will either be as shown in (12), where the entire relative clause constitutes the unaccented tail of the focal F headed by the antecedent *(en) til* ((one) more; "someone else"), or else as shown in (13), where there are two postfocal (backgrounded) F units, one for each accentable word form, after the antecedent focus.

(12) ((de (^{2}eneste-som F) (^{1}var-i F) (^{1}huset-var-en F)
(^{1}løytnant-som-snakket F) (^{1}BERGENSDIALEKT F) IP) IU)
((og (^{1}en F) (^{1}TIL-som-snakket-bergensdialekt F) IP) IU) ...

(13) ((de (^{2}eneste-som F) (^{1}var-i F) (^{1}huset-var-en F)
(^{1}løytnant-som-snakket F) (^{1}BERGENSDIALEKT F) IP) IU)
((og (^{1}en F) (^{1}TIL-som F) IP) (^{2}snakket F) (^{1}bergensdialekt F) IU) ...

In discourse (14) there is just one relative clause, but its antecedent is the same phrase *en til* which appeared in (11)-(13).

(14) Til høyre satt eieren av flyet og en til som jeg ikke hadde møtt før.
To the right were sitting the owner of the airplane and someone else that I had never met before

Since there is a single relative clause construction in (14), one might assume that the only likely kind of intonational phrasing applicable here would be one with a focal phrase-accent on the final accentable item in the relative clause, the participle *møtt* ("met"):

(15) ((til (^{1}høyre F) (^{1}satt F) (^{2}eieren-av F) (^{1}flyet-og F) (^{1}en F)
(^{1}til-som-jeg F) (^{2}ikke-hadde F) (^{1}MØTT-før F) IP) IU)

The truth is that even the relative in (14) may be intoned in the way illustrated by the second of the identical relatives in (12) and (13), respectively. (16) and (17) are information-structurally equivalent utterance types, and pragmatically different from (15).

(16) ((til (^{2}høyre F) (^{1}satt F) (^{2}eieren-av F) (^{1}flyet-og F)
(^{1}en F) (^{1}TIL-som-jeg-ikke-hadde-møtt-før F) IP) IU)

(17) ((til (^{2}høyre F) (^{1}satt F) (^{2}eieren-av F) (^{1}flyet-og F)
(^{1}en F) (^{1}TIL-som-jeg F) IP) (^{2}ikke-hadde F) (^{1}møtt-før F) IU)

Sentence (14) realized with the intonation structure of (15) conversationally implicates that the speaker, who says explicitly that he hadn't met the last-mentioned guy before, had indeed met the other man, the one described as the owner of the plane, on one or more occasions in the past. If that were not the case, one would have expected the same characterization of both guys, namely that the speaker had not met them before. When one of them, but not the other one, is described as having a specific property, then it is reasonable to assume that the other individual lacks that property.

The intonational phrasings of (16) and (17) on the other hand communicate the same as the corresponding patterns assigned to the IU *en til som snakket Bergensdialekt* in (12) and (13), respectively. Here the property explicitly assigned to the last-mentioned individual is also evidently a property of the first-mentioned individual. This means that a person processing (16)/(17) will access a contextual assumption which is the contrary of an assumption accessed by the addressee of (15). Even if the speaker does not *say* that she hadn't met the owner of the plane before, the addressee cannot avoid updating his context by inferring that that is part of what the speaker intends to convey.

There is an ontological difference between the contextual assumption recovered in (16)/(17) and the contrary assumption inferable in (15). The assumption that the speaker of (15) had met the owner of the plane before is much more context-dependent than the contrary assumption deducible from (16)/(17). It is cancellable, which is what a well-behaved Gricean conversational implicature should be. The speaker may continue by adding the information that she had not seen either the owner of the plane or the other man before.

In (16)/(17), however, the assumption that the speaker had not previously met the owner of the plane does not seem to be cancellable at all. Yet it is not what Grice calls a conventional implicature. The assumption would admittedly not be deducible without the antecedent phrase *en til* ("someone else") but that expression was the same in (15) as in (16)/(17), and the assumption recoverable from (16)/(17) is not recoverable on the basis of (15). What the two intonation patterns of (16) and (17) with a focus-free relative clause tell us is that the description of the referent of the complex NP (*en til som jeg ikke hadde møtt før*) as someone the speaker hadn't met before is also a valid description of some other contextually recoverable referent. And there is one quite obvious candidate in (16)/(17), namely the referent of the first conjunct: *eieren av flyet* ("the owner of the plane").

Observe that there is no syntactic difference between (14) realized as in (15) and (14) realized as in (16)/(17). An enticing solution which one can easily prove to be wrong would be to postulate an antecedent in the form of NP coordination in the syntactic structure representing (16)/(17). Suppose we proposed that *en til* is the antecedent of the relative clause when there is an intonational focus inside the relative clause, and that the coordinative NP *eieren av flyet og en til* ("the owner of the plane and someone else") is the antecedent when the intonational focus is retracted to the word form *til*. Have we not thereby found a way to account for our intuitive feeling that the description provided in the relative clause applies not only to the closest NP *en til* but also to the NP *eieren av flyet* with which the former is conjoined? No, because the relative clause is restrictive, and the syntactic form of the first conjunct precludes modification by means of a restrictive relative clause. A formal criterion serving to differentiate restrictive and nonrestrictive relatives is the speaker's opportunity to leave out the relativizer with the former, but not with the latter type of relative clause. (18a) is a grammatically well-formed complex NP; (18b) is not - unless the antecedent is taken to be just *flyet* ("the plane"), which is on the other hand a pragmatically odd interpretation because the plane is inanimate.

(18) a [en til]$_i$ Ø$_i$ jeg ikke hadde møtt før, ...
someone else I had not met before ...

b *[eieren av flyet]$_i$ Ø$_i$ jeg ikke hadde møtt før, ...
the owner of the plane I had not met before, ...

The only type of relative clause which can modify the complex NP *eieren av flyet* is a nonrestrictive relative:

(19) eieren av flyet, som jeg ikke hadde møtt før, ...
the owner of the plane, whom I had not met before, ...

Furthermore, the contextual assumption that the speaker had not previously met the owner of the plane does not depend on the kind of syntactic coordination found in our example (14). The 'earlier NP', our Norwegian phrase *eieren av flyet*, does not have to be conjoined with the antecedent of the relative clause in order for the the addressee to access the relevant assumption. It is nearly as accessible in (20) as it was in (16)/(17), despite the 'distance' between the relative clause and the referent corresponding to the *x* to be identified in the open proposition 'it is not the case that the speaker had met *x* before *t* $_i$'.

(20) Til høyre satt eieren av flyet. Han hadde en bandasje om hodet, og så virkelig forferdelig ut. I tillegg var klærne hans tilsølte. ((på den (^{2}ANDRE F) IP) ((^{2}siden-av F) (^{1}bordet F) (^{1}satt F) (^{1}en F) (^{1}TIL-som-jeg-ikke-hadde-møtt-før F) IP) IU)

To the right sat the owner of the plane. He had a bandage around his head and looked truly terrible. In addition his clothes were soiled. On the OTHER side of the table sat someone ELSE that I had not met before.

I mentioned that our inferred assumption that the speaker of (16)/(17) had not previously met the owner of the plane is a non-cancellable assumption. Adherents of relevance theory would presumably classify this assumption as an explicature. As noted in 1.1, Sperber and Wilson (1986) distinguished explicit and implicit communication in a novel manner. This is how they defined explicit communication:

(21) An assumption communicated by an utterance *U* is *explicit* if and only if it is a development of a logical form encoded by *U*. (Sperber and Wilson 1986:182)

Arriving at an explicature may involve some contextually inferred conceptual features; the inferred assumption may be explicit to a greater or lesser degree, depending on the relative contribution of contextual features. As the authors point out, a more traditional way to draw the distinction between explicitly and implicitly communicated information is that explicit content is simply decoded, and retrieval of implicit content involves inference. Sperber and Wilson, however, claim that any conveyed assumption must be arrived at through inferential processes. Identification of the propositional form of an utterance is no exception. Thus recovering (more or less context-dependent) explicatures involves inferential communication just as much as recovering those implicatures that depend on the listener's active use of encyclopaedic knowledge. And only such assumptions are recovered as are consistent with the least effort-consuming context that the listener is able to establish.

The assumption stemming from (14) pronounced as in (16) or (17) will be recovered without reliance on any other contextual element than a fairly uncomplicated access to a contextually given referent to whom one can assign the attribute spelled out in the relative clause *som jeg ikke hadde møtt før*. Apart from the pragmatic condition that there be an accessible referent to assign that property to, all we need is the ability to decode the expression *en til* and the ability to interpret, as intended, the intonational choices made by the speaker of (16)/(17), contrasting with the intonational phrasing of (15). No encyclopaedic knowledge or other contextual clues are required to recover the relevant assumption. It is immediately accessible to any native speaker of Norwegian, unlike the contrary assumption associated with the utterance of (15).

The situation is exactly the same in spoken English as in Norwegian. (22), where the intonational focus (marked by caps, as usual) is on the last accentable item in the relative clause, conversationally implicates the (cancellable) assumption that the speaker had already met the owner of the plane, while (23), where the intonational focus is right before the relative

clause, generates the noncancellable assumption that the speaker had not met the owner of the plane prior to the occasion reported in that utterance.

(22) To the right were the owner of the plane and someone else I hadn't MET before.

(23) To the right were the owner of the plane and someone ELSE I hadn't met before.

4 Accessing the intended referent means accessing the right context

Referent accessibility, in the sense of current literature on anaphor resolution, and context accessibility, in the sense of relevance- theoretical studies, should not be investigated as if they were unrelated phenomena. Referent and context accessibility are interconnected. Other things being equal, the preferred candidate referent for a referring expression is the one that makes the conversation pragmatically more acceptable, or more coherent, than other candidate referents. A recipient will automatically look for a reference assignment which makes the utterance containing the discourse anaphor relevant in its verbal context. It should yield some contextual implications that can be accessed without unjustifiable mental effort on the part of the recipient.

Relevance will frequently have to be established with the help of implicit assumptions, like the 'bridging' assumptions of Clark and Haviland (1977). Bridging implies that a candidate referent for a referring expression is introduced by means of a contextual assumption which the addressee has to infer. Another possibility is that there is an inferable causal relationship between two expressed propositions. The speaker is counting on the hearer's ability to infer the causal link, without which the discourse would not seem to constitute a coherent whole.

Consider the following Norwegian mini-discourse, first in normal orthographical form with no use of any diacritics or punctuation conventions that might reveal certain critical features of the prosodic form of the declarative in which the personal pronoun *hun* ("she") appears.

(24) Lena kontaktet Tone. Astrid sa at hun godt kunne tenke seg å være med.
Lena contacted Tone. Astrid said that she wouldn't mind participating

It is not necessary to introduce a covert candidate referent in order to interpret (24) as intended; no bridge is needed, the problem is rather that there are too many overt candidate referents. There are three almost equally salient potential antecedents of the female pronoun *hun* in (24), as the three names Lena, Tone, and Astrid all refer to females. How will an addressee be able to access the referent that the speaker had in mind when there are too many accessible referents?

Before addressing that question directly I am going to make the claim that being the most salient entity at a given point in a discourse should not

be equated with being the most accessible candidate referent for a referring expression. I would claim that the most salient individual at the point where the pronoun appears is probably the woman referred to by means of the proper name *Astrid*, whose complement contains the pronoun whose reference we are trying to establish.

Evidence for attributing a higher cognitive status (in the sense of GHZ) to Astrid than to Lena and Tone comes from the fact that as many as six of my twelve native Norwegian informants who took part in a comprehension test accessed Astrid as the referent of *hun* when the pronoun was realized without word-accent and without stress (stress being a prerequisite of the tonally based Norwegian word-accent, and being manifested principally as increased duration). My own 'objection' to that referent assignment is that it ignores the relevance principle. If *hun* is taken to be coreferential with *Astrid*, then it is in my opinion relatively harder to construe (24) as a coherent text than if one infers the existence of an antecedent-anaphor relation between *Tone* and *hun*. The latter interpretation rests on the assumption that Astrid's action described in the second statement and Lena's action described in the first statement are related as cause and effect, respectively. Lena's communication with Tone is a direct consequence of Astrid having informed Lena in advance that Tone would like to participate.

Coreference between the NPs *Astrid* and *hun* on the other hand suggests a context such that the second statement parallels the first statement; *Astrid* and *Lena* will then appear as contrastive themes. But that context leaves us with the following question, to which there seems to be no satisfatory answer: what exactly is the semantic link between the two sentences?

The other half of the group of informants - i.e. six out of twelve again - said that *hun* referred to Tone when (24) was produced with an unstressed *hun*. If we are justified in assuming that Tone and Astrid are being presented by the speaker as individuals enjoying the same cognitive status - presumably the highest possible status, in focus - then I would have expected a larger number to access Tone, because that reference assignment impresses me as being more pragmatically acceptable, more contextually relevant. On the other hand, the distance criterion (cf. Ariel 1990) and the grammatical subject status of the NP *Astrid* point to a somewhat higher degree of salience for Astrid than for Tone.

The overall test results indicate that the fairly high score for *Astrid*$_i$ - *hun*$_i$ coreference is due to the prosodic attentuation of the pronominal form. An unaccented pronoun is a sign to the addressee to select the most salient referent, and half of my informants did let the unaccented pronoun in version (25) below be their principal cue to reference assignment. However, the other half apparently paid less attention to the accent parameter, and gave priority to a search for a referent that would fit into a relevant context. When asked to assign reference to the accented pronoun

hun in (26), there was a significant change from six votes for each of the women - in (25) - to nine votes for Tone and three for Astrid - in (26).

(25) Lena kontaktet Tone. ((([2]astrid F) ([1]sa-at-hun F)
([1]godt-kunne F) ([2]tenke-seg-å F) ([2]VÆRE-med F) IP) IU)
Lena contacted Tone. Astrid said that she wouldn't mind participating

(26) Lena kontaktet Tone. ((([2]astrid F) ([1]sa-at F) ([1]hun F)
([1]godt-kunne F) ([2]tenke-seg-å F) ([2]VÆRE-med F) IP) IU)
Lena contacted Tone. Astrid said that shé wouldn't mind participating

Replacing the past tense form *sa* (said) in (24) with past perfect *hadde sagt* (had said) ought to make it relatively easier to access the context in which Astrid's statement reported in the second declarative was temporally prior to Lena's action reported in the first declarative, which is a precondition for recovering the causal link that makes Tone the preferred pronominal referent.

Adding the past perfect versions of (27) and (28), with unaccented and accented pronoun, respectively, I observed a very neat increase in the number of votes for Tone at the expense of Astrid. Eight informants judged *hun* to refer to Tone when the pronoun was unaccented, while as many as eleven out of twelve informants made that judgement when the pronoun was accented.

(27) Lena kontaktet Tone. ((([2]astrid-hadde F) ([1]sagt-at-hun F)
([1]godt-kunne F) ([2]tenke-seg-å F) ([2]VÆRE-med F) IP) IU)
..... Astrid had said that she wouldn't mind participating
(28) Lena kontaktet Tone. ((([2]astrid-hadde F) ([1]sagt-at F) ([1]hun F)
([1]godt-kunne F) ([2]tenke-seg-å F) ([2]VÆRE-med F) IP) IU)
..... Astrid said that shé wouldn't mind participating

A shift from past to past perfect has a positive effect on the informants' sense of textual coherence from the first to the second statement. The speaker is making Tone relatively more *accessible* both by substituting the past perfect of (27)-(28) for the past tense used in (25)-(26), and by substituting an accented pronoun *hun* - in (26) and (28) - for an unaccented one - in (25) and (27). However, the speaker does not signal a change in the assumed cognitive status of Tone by using (28) instead of (27), or (26) instead of (25). I am not prepared to defend the position that Tone is presented by the speaker as a more *salient* discourse referent than Astrid when word-accent is assigned to the pronoun, and that we get a cumulative salience-enhancing effect from combining past perfect and pronoun accentuation.

On my account, by accenting a given pronoun the speaker is increasing the accessibility of a candidate referent that is *not* optimally

salient. Accent on the pronoun in conjunction with past perfect *hadde sagt* turned out to produce an interesting synergetic result. Those changes do not affect the cognitive status of any of the three individuals referred to in my discourse but they did increase the accessibility of Tone, at the expense of Astrid.

A coordinating connective *og* ("and") inserted between the declaratives of (25)-(26) and (27)-(28) is a powerful contextualiz-ation cue. I had the same informant group listen to a set of four utterances with overt coordination, with alternating tense selection and a choice between unaccented and accented *hun*, as shown in (29)-(32). As in the previous set without overt coordinator, broad-focus intonation, i.e. a single IP exhausting the IU, was used throughout.

(29) Lena kontaktet Tone, ((og (^{2}astrid F) (^{1}sa-at-hun F)
(^{1}godt-kunne F) (^{2}tenke-seg-å F) (^{2}VÆRE-med F) IP) IU)

(30) Lena kontaktet Tone, ((og (^{2}astrid F) (^{1}sa-at F) (^{1}hun F)
(^{1}godt-kunne F) (^{2}tenke-seg-å F) (^{2}VÆRE-med F) IP) IU)
Lena contacted Tone,
and Astrid said that she wouldn't mind participating

(31) Lena kontaktet Tone, ((og (^{2}astrid-hadde F) (^{1}sagt-at-hun F)
(^{1}godt-kunne F) (^{2}tenke-seg-å F) (^{2}VÆRE-med F) IP) IU)

(32) Lena kontaktet Tone, ((og (^{2}astrid-hadde F) (^{1}sagt-at F)
(^{1}hun F) (^{1}godt-kunne F) (^{2}tenke-seg-å F) (^{2}VÆRE-med F) IP) IU)
... , and Astrid had said that she wouldn't mind participating

The informant reactions to (29)-(32) showed a markedly different pattern than their reactions to (25)-(28). Neither the tense nor the accent parameter was of any importance in the informants' pronominal reference assignments in (29)-(32), while those parameters were seen to play a significant role in the utterances that did not contain an overt coordinator *og*. By adding the connective the speaker is effectively barring the interlocutor's access to the interpretation that Lena contacted Tone$_{i}$ because Astrid (had) said that she$_{i}$ wouldn't mind participating. What we are left with instead is an accessible context involving two parallel communicative events: Lena is contacting Tone to find out whether Tone accepts to take part in some contextually given enterprise, and Astrid is volunteering to engage in the same enterprise. All twelve informants accessed *Astrid* as the antecedent of *hun* throughout the coordination set of (29)-(32).

Table 1 below sums up the distribution of reference assignments, i.e. the informants' primary choices, for the full set of utterance types (25)-(32).

Table 1

	Primary (preferred) choice		
	Lena$_i$ - hun$_i$	Tone$_i$ - hun$_i$	Astrid$_i$ - hun$_i$
(25)	-	6	6
(26)	-	9	3
(27)	-	8	4
(28)	-	11	1
(29)	-	-	12
(30)	-	-	12
(31)	-	-	12
(32)	-	-	12

The informants were also given the opportunity to mark a subsidiary (non-preferred) choice if they felt that more than one candidate referent was accessible. Referential ambiguity was noted by no one in the connective-free cases; for (29)-(32) there were three votes for Lena as a possible referent of the pronoun in (30), and there were two votes for Lena in (32), while Tone was considered a possible referent by four and two informants, respectively, in (30) and (32). It was only those two utterances - (30) and (32) - that opened for referential ambiguity. It is significant that those two are the utterances which contained an accented pronoun. That prosodic feature was seen to ease the listeners' access to Tone in the corresponding connective-free versions (26) and (28), but it lost its purpose when the coordinator was added.

There is a systematic pattern behind the results obtained. Subsidiary candidate referent choices were only made where structural traits that would otherwise have favored Tone clashed with the presence of the coordinating connective. The picture emerging from my comprehension test is that establishing *Tone$_i$ - hun$_i$* coreference means accessing a context which implies that Lena's contact with Tone was justified by Astrid's having told Lena that Tone would be willing to participate. This is an interpretation that seems to meet Sperber and Wilson's relevance criterion. It immediately makes more sense to most listeners than any contextual interpretation consistent with the competing antecedent-anaphor relation between *Astrid* and *hun*. In order to access it, however, a listener may need some help from supporting structural cues, in our case from the speaker's choice of past perfect *hadde sagt* ("had said") instead of simple past, and an accented personal pronoun instead of an unaccented one. The whole point is that the way the discourse is structured syntactically, the most salient referent is the last-mentioned person, Astrid. Recall that *Astrid$_i$ - hun$_i$* coreference got exactly half of the votes in (25) but only a single vote in (28) where a synergy effect from the cooccurrence of past perfect and accented pronoun was responsible for the high *Tone$_i$ - hun$_i$* score. Using a prosodically prominent pronoun was seen to be a particularly helpful means to convey the causal relation which that coreference assignment suggests.

In my view, word-accent on the pronoun serves as a sign to the listener to *bypass the most salient referent* and access one that presumably has a lower cognitive status. In the whole set of alternative utterance types (25)-(32), (28) has the structure which favors the *S1 because S2* interpretation the most. That a competing reference assignment was just as accessible in (25), and that it was less popular in (28) than in (27), can, I think, be accounted for only if we acknowledge that Astrid has a higher cognitive status than either Tone or Lena in all versions. The pronominal accent in (26) and (28) does not give Tone a position higher in the 'givenness hierarchy' there than in the versions with an unaccented pronoun. Accent on the pronoun works just as expected. The woman called Tone is accessed more easily when the pronoun is accented, precisely because the word-accent directs the recipient's attention to a less than optimally salient referent. The accent parameter is particularly important in linguistic environments containing more than one possible NP antecedent. In such environments a null anaphor, or an unobtrusive unstressed pronoun normally gives access to en entity in focus, while accent placement on a pronominal anaphor enables us to access an entity that is not in focus.

Unstressed pronouns are ranked higher on Ariel's Accessibility Marking Scale (cf. (2) in 1.2 above) than stressed ones, but as the speaker's prosodic handling of an item neither increases nor decreases its semantic content, the choice between a stressed and an unstressed pronoun might be expected not to affect referent accessibility much. The truth, of course, is that it does, and Ariel's theory predicts that it does, because deaccentuation is an example of what she calls 'attenuation'. Accenting a referring phrase has the opposite effect, according to Ariel; it is supposed to code a lower degree of accessibility of the intended referent.

While Ariel and I agree that the choice between accented and unaccented affects accessibility, we disagree about the function of the accent parameter. My position is that if we say that accentuation of a pronominal discourse anaphor serves as an instruction to the addressee to bypass the most salient candidate referent and access one that is less salient, then there is nothing paradoxical about a situation where *relatively more accessible* is *relatively less salient*.

One should bear in mind, however, that it is not primarily the word-accent on *hun* as such that is responsible for the increased accessibility of Tone in (26) and (28). Accessibility never depends on prosodic handling alone. The *Tone*$_i$ - *hun*$_i$ coreference assignment scored so well in the case of utterance (28) because the accent on the pronoun accords with the construction of an *optimally relevant context*, the *S1 because S2* context, and the use of past perfect *hadde sagt* ("had said") gives further support to that contextualization. On the other hand, the coordination structures of (29)-(32) makes that kind of context virtually inaccessible, as shown by the unanimous pronominal reference assignments in those four utterances. There the most salient referent - Astrid - was also, as one would expect, the most accessible referent.

While the second sentence of (33) is infelicitous if the two occurrences of the name *Astrid* are meant to refer to the same individual, (34), with a non-prominalized *Tone*, is perfect.

(33) Lena kontaktet Tone$_i$. #Astrid$_j$ hadde sagt at Astrid$_j$ godt kunne tenke seg å være med.
Lena contacted Tone$_i$.
#Astrid$_j$ had said that Astrid$_j$ wouldn't mind participating

(34) Lena kontaktet Tone$_i$. Astrid$_j$ hadde sagt at Tone$_i$ godt kunne tenke seg å være med.
Lena contacted Tone$_i$.
Astrid$_j$ had said that Tone$_i$ wouldn't mind participating

Ariel might argue that substituting the first name *Tone* for the pronoun *hun* in (34) will maximize accessibility, because Tone, who was referred to by means of the direct object NP of the preceding sentence, has a lower degree of accessibility (than Astrid) in the first place. But since my comprehension test revealed that Tone was accessed by 50% of the informants even when the pronoun *hun* was deaccented, the test at least did not support the idea that there is a difference in *accessibility* between Astrid and Tone in our data set (25)-(28). There is indeed a difference in their accessibility in (29)-(32), but that, I have argued, is due to the greater salience of Astrid, who is the referent of the grammatical subject of the second sentence. My hypothesis is that when relevance criteria no longer seem to be applicable, as in (29)-(32) presented to the test subjects with no further specification of the scenario or the main topic of discourse, then a listener will rather automatically behave in such a way that we can conclude that maximal salience equals maximal accessibility. The accessibility of the highly salient referent Astrid increased, as expected, with the use of a High Accessibility Marker like an unaccented pronoun (cf. (25) in contrast to (26) and (28)), but it increased much more dramatically with the addition of a coordinating connective between the two declaratives (cf. (29)-(32)). It was the connective *og* that for most informants shut their access to all candidate referents other than Astrid. While accenting the pronoun and substituting past perfect tense for past tense had accessibility consequences in (25)-(28), those two structural changes were completely overridden by the inserted connective in (29)-(32).

Ariel (1991:462) explicitly makes the point that languages never license the use of a higher Accessibility Marker where some lower Accessibility Marker would also be infelicitous. This is consistent with the GHZ theory. But the spirit of Ariel's work is such that I feel the reader is being invited to conclude that she believes the constraint to work in the opposite direction, too, meaning that a relatively lower Accessibility Marker would be inappropriate if the referent meets the condition for the

appropriate use of a relatively higher Accessibility Marker. The latter position is not compatible with the GHZ theory, or with my own position.

Thus far, when I have used the term accented pronoun with reference to the broad-focus data of (25)-(32), the pronoun has headed a nonfocal F, one that is not final in its IP. What would happen if we let the phrase-accent be focal instead? Would a focus tone at the end of the F headed by *hun* affect accessibility? One might conjecture that a focussing device like the raised H tone of an IP-final F implies that its referent is even less accessible than what would be expected if there was no focus tone at the end of the F.

As far as I am concerned the focal/nonfocal contrast does not in itself have much of an impact on the relative accessibility of two or more candidate referents, but a focussed pronoun in conjunction with certain other structural features gives us a wholly new picture. Consider (35), where there is no coordinator and where the verb form in the second sentence has the past perfect tense marking.

(35) Lena kontaktet Tone. ((([2]astrid-hadde F) ([1]sagt-at F)
([1]HUN-kunne F) IP) (([1]GODT-tenke-seg-å-være-med F) IP) IU)
lit: ... Astrid had said that SHE could WELL imagine herself to be with

What we find here looks rather similar to utterance (25). Past perfect cooccurring with a personal pronoun that has the highest degree of prosodic prominence recognized by the Trondheim model of intonation, does that mean that Tone will automatically be accessed as the referent of *hun*? It does not. Although I did not include an utterance exhibiting the structure of (35) in my comprehension test, the facts are quite clear. *Astrid* and *hun* are coreferential in (35), and the determining structural feature is the word order in the *at*-complement. The adverb *godt* ("well") succeeds the finite auxiliary *kunne* ("could"), which differs from the subordinate clause order of (25)-(32) where the adverb preceded the auxiliary. The use of main clause order in (35) is a device which is nondistinguishable from what we find in so-called 'semi-indirect discourse', or what Jespersen (1924) called 'represented speech' (Fillmore 1981). The speaker is reporting what Astrid said, and has assumed Astrid's point of view. The intonational phrasing in the complement of the verb of saying is supposed to reflect Astrid's original statement, presumably something like (36).

(36) ((([1]JEG-kan F) IP) (([1]GODT-tenke-meg-å-være med F) IP) IU)
lit.: I can WELL imagine myself to be with

(36) is a theme-rheme structure. A full intonation-based theme-rheme structure is a main clause phenomenon but in (35) the two narrow foci to be associated with theme and rheme, respectively, are both inside the embedded clause, as demonstrated by the focal peak alignments in the fundamental frequency tracking in Figure 3.

Figure 3

(astrid sa at HUN kunne IP) (GODT tenke seg å være med IP)

The intonation of (35)/Figure 3 may resemble Astrid's own utterance very closely, with just the 1st person --> 3rd person, and present tense --> past tense adjustments needed to get from (36) to (35), or it may portray some salient features of Astrid's own utterance in a somewhat freer manner (cf. Sperber and Wilson 1986, Blass 1990, on 'interpretive' use of language). The important lesson for us is that my ideas about how the correct referent is accessed when there is more than one candidate referent, as in (25)-(32), do not generalize to cases of semi-indirect discourse like the vivid report in (35)/Figure 3.

It was mentioned at the end of 1.3 that in order for East Nowegian speakers to produce the boundary tone **H%** and hence avail themselves of the **H%/L%** opposition their intonational phrasing must be such that the final F in the IU ends in the focus tone indicative of focal phrase-accent. A consequence of that constraint is that a referring expression, pronominal or not, may receive the focal phrase-accent of thematized phrases due to the speaker's choice of boundary tone, and not because the referent has a low cognitive status for the speech participants. The intended referent of *Kristian/han* in (37) B is maximally salient, and the speaker's choice of **H%**, which accounts for the focus on the name *Kristian*, will generally be interpreted as a sign that speaker B is surprised at the interlocutor's accusation.

(37) A: Du sa ikke fra til Kristian, som du lovte.
You didn't notify Kristian, as you promised to do
B: ((jo jeg (^{2}SA-fra-til F) IP) ((^{1}KRISTIAN/^{1}HAN **H%** F) IP) IU)
Yes, I did notify Kristian/him!!

The focal phrase-accent on the direct object of B's sentence should not be confused with so-called 'contrastive' accentuation. There is no uniqueness implicature here, meaning that there were other people who were not notified.

An unaccented proper name *Kristian* in B's utterance would also produce an IU-final focal F, but the phrasing shown in (37') is inappropriate because speaker B is now presenting the lexical verb *si fra* ("notify") as if it were brand new in the discourse (see Fretheim and Nilsen forthcoming).

(37') A: Du sa ikke fra til Kristian, som du lovte.
You didn't notify Kristian, as you promised to do

B: #((jo jeg (^{2}SA-fra-til-kristian F) IP) IU)
Yes, I NOTIFIED him

A narrow focus on the finite verb, as in (37), is an obligatory intonational feature when the only new information is the affirmation of the proposition underlying the interlocutor's polar question in an immediately preceding turn.

Accentuation, then, is utilized for a variety of purposes in spoken Norwegian, and Norwegian is certainly not different from other languages in this respect. Signaling assumed cognitive status of discourse entities is only one of several determinants of accentuation/deaccentuation in referring expressions.

The argumentation in the present section is based on the hypothesis that there is just one entity that should be associated with the highest cognitive status, what GHZ call 'in focus', at any given point in a discourse. There is no such claim in GHZ, but I believe the idea of a unique 'in focus' entity (possibly a set, as when the referents A and B are referred to by the conjunction *A and B* and immediately after by the unstressed pronoun *they*) to be supported by the result of my comprehension test involving the eight utterance types (25)-(32).

I found, not surprisingly, that *ceteris paribus*, the prosodically most attenuated realization of the Norwegian personal pronoun *hun* favors access to the referent denoted by the grammatical subject of the second sentence, the proper name *Astrid*. And I pointed out that referent accessibility depends on much more than the salience, or cognitive status of the candidate referents. More than anything else, referent accessibility depends on the accessibility of a context that makes the utterance with the anaphor whose referent is to be resolved *relevant*, meaning that it must give access to some contextual implications without undue expenditure of mental efforts. Two structural features in particular were seen to contribute to making a relevant context more accessible than it would otherwise be. Those were pronominal accentuation and past perfect tense, the former suggesting that the candidate referent in focus should be ignored by the recipient, the latter that the order of events was the opposite of what the linear order of declaratives suggests in the unmarked case.

What I have found particularly appealing in the GHZ framework, though, is that their six cognitive statuses are ordered from most restrictive to least restrictive. As long as their statuses are implicationally related and not mutually exclusive I do not even have to worry about the presence of narrow intonational focus on a phrase referring to a maximally salient discourse entity, as in (37). I would have a harder time trying to reconcile some of the intonational data from Norwegian with Ariel's Accessibility Theory where categories do seem to be mutually exclusive.

5 Summing up

After a lengthy introduction in which I accounted for the intellectual 'context' of my own research endeavors, I discussed a specific self-experienced case of addressee failure to access speaker context, which was resolved because the addressee, in failing to see the relevance of the speaker's choice of intonation pattern, asked a metacommunicative question to try to resolve the contextual mismatch between the interactants. Then, in section 3, I showed how intonation gave access to an assumption that I classified as a relevance-theoretical explicature. The only processing cost to be considered was seen to relate to the identification of the referent "x" in an assumption of the form "There is some person x other than the referent of the antecedent *en til* ("one more [person]") of the Norwegian relative clause *som jeg ikke hadde møtt før* ("whom I hadn't met before"), who fits the description given in the relative." The identity of Mr X was readily accessible, as the immediate linguistic environment contained an NP referring to "the owner of the plane". Finally, in section 4 I tried to make good that accessing the correct antecedent means accessing a context that makes the utterance where the anaphor appears look relevant. A listener's reference assignments will not normally contradict Sperber and Wilson's relevance principle. If selecting the most salient candidate referent means selecting a less than optimally relevant context, chances are that that candidate referent will not be accessed, in spite of its salience, or high cognitive status. There may be a slightly less salient candidate referent that is more easily accessible because that reference assignment contributes to coherence in a more obvious manner than any alternative reference assignment. I have argued that even if a speaker's choice of referring expression may reflect degree of salience of the referent in a fairly direct way, degrees of accessibility is not codifiable in the same way. Degree of referent accessibility is probably much more dependent on degree of context accessibility than envisioned for instance by Ariel in her past and current work on Accessibility Theory.

References

Ariel, Mira, 1985. The discourse functions of Given information. *Theoretical Linguistics*, 12:99-113.

Ariel, Mira, 1988. Referring and accessibility. *Journal of Linguistics* 24:67-87.

Ariel, Mira, 1990. *Accessing Noun-Phrase Antecedents.* London:Routledge.

Ariel, Mira, 1991. The function of accessibility in a theory of grammar. *Journal of Pragmatics*, 16:443-464.

Blakemore, Diane, 1992. *Understanding Utterances.* London:Blackwell.

Blass, Regina, 1990. *Relevance Relations in Discourse.* Cambridge:Cambridge University Press.

Carston, Robyn, 1988. Implicature, explicature, and truth-theoretic semantics. In R.M.Kempson, ed. *Mental Representations.* Cambridge:Cambridge University Press.

Clark, Herbert H. and Haviland, Susan E., 1977. Comprehension and the given-new contract. In R.O. Freedle, ed. *Discourse production and comprehension.* Norwood,N.J.:Ablex, 1-40.

Fillmore, Charles J., 1981. Pragmatics and the description of discourse. In P. Cole, ed. *Radical Pragmatics.* New York:Academic Press, 143-166.

Fodor, Jerry A., 1983. *The Modularity of Mind.* Cambridge:MIT Press.

Fretheim, Thorstein, 1987. Pragmatics and intonation. In J. Verschueren and M. Bertuccelli-Papi, eds. *The Pragmatic Perspective.* Amsterdam:John Benjamins, 395-420.

Fretheim, Thorstein, 1991. Intonational phrases and syntactic focus domains. In J. Verschueren, ed. *Levels of Linguistic Adaptation.* Amsterdam:John Benjamins, 81-112.

Fretheim, Thorstein, 1992a. The effect of intonation on a type of scalar implicature. *Journal of Pragmatics* 18:1-30.

Fretheim, Thorstein, 1992b. Themehood, rhemehood and Norwegian focus structure. *Folia Linguistica* XXVI:111-150.

Fretheim, Thorstein, 1992c. Grammatically underdetermined theme-rheme articulation. *ROLIG* 42, Roskilde University.

Fretheim, Thorstein, in press. Relevans i samtaler. In T. Fretheim, L.S. Evensen and E. Sivertsen, eds. *Tekst i Kontekst.* Oslo:Novus.

Fretheim, Thorstein and Nilsen, Randi Alice, forthcoming. The Norwegian broad-focus avoidance strategy. In B. Granström and L. Nord, eds. *Nordic Prosody VI.* Stockholm:Almqvist & Wiksell.

Goldsmith, John A., 1990. *Autosegmental & Metrical Phonology.* London:Blackwell.

Grice, H.P., 1975. Logic and conversation.
In P. Cole and J. Morgan, eds. *Syntax and Semantics*, Vol. 3: *Speech Acts*. New York:Academic Press.

Grice, H.P., 1989. *Studies in the Way of Words*.
Cambridge:Harvard University Press.

Gundel, Jeanette K., Hedberg, Nancy, and Zacharski, Ron, 1988.
On the generation and interpretation of demonstrative expressions *Proceedings of the International Conference on Computational Linguistics* 12:216-221.

Gundel, Jeanette K., Hedberg, Nancy, and Zacharski, Ron, 1989.
Givenness, implicature and demonstrative expressions in English discourse. *Chicago Linguistic Society* 16:442-453.

Gundel, Jeanette K., Hedberg, Nancy, and Zacharski, Ron, 1990.
Givenness, implicature, and the form of referring expressions in discourse. *Berkeley Linguistics Society*

Gundel, Jeanette K., Hedberg, Nancy, and Zacharski, Ron, in press.
Cognitive status and the form of referring expressions in discourse. *Language*.

Jespersen, Otto, 1924. *The Philosophy of Grammar*.
New York:Norton & Co. (reprint)

Kandolf, Cindy, in press. On the difference between implicatures and explicatures in relevance theory.
Nordic Journal of Linguistics 16:1, 1993.

Leech, Geoffrey N., 1983. *Principles of Pragmatics*. London:Longman.

Nilsen, Randi Alice, 1989. On prosodically marked information structure in spoken Norwegian. *University of Trondheim Working Papers in Linguistics* 7:1-100.

Nilsen, Randi Alice, 1992. Intonasjon i interaksjon. Unpublished doctoral dissertation, Linguistics department, University of Trondheim.

Pierrehumbert, Janet B., 1981. The phonology and phonetics of English intonation. Doctoral dissertation, MIT.

Pierrehumbert, Janet B. and Hirschberg, Julia, 1990. The meaning of intonational contours in the interpretation of discourse.
In Ph.R. Cohen, J. Morgan and M.E. Pollack, eds.
Intentions in Communication. Cambridge:MIT Press, 271-312.

Sacks, Harvey, Schegloff, Emmanuel A. and Jefferson, Gail, 1974.
A simplest systematics for the organization of turn-taking in conversation. *Language* 50:696-735.

Sperber, Dan and Wilson, Deirdre, 1986. *Relevance*. London:Blackwell.

Wilson, Deirdre, 1992. Reference and relevance. *UCL Working Papers in Linguistics* 4, Department of Phonetics and Linguistics, University College London. 167-192.

Wilson, Deirdre and Sperber, Dan, 1990. Linguistic form and relevance.
UCL Working Papers in Linguistics 2.
Department of Phonetics and Linguistics, University College London. 95-112.

"ALTSÅ" AND "NEMLIG": TWO VIEWS OF CAUSALITY.

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This paper discusses some functions of two Norwegian particles "altså" and "nemlig", and proposes that, as modal particles, they point to a cause - effect relation between propositions. "Altså" codes the proposition of the clause that the particle modifies as the consequence or effect element in a causal chain, while "nemlig" attaches to the linguistic expression of the cause of some event or state.

1. Introduction

"Altså" and "nemlig" can both function as modal particles. Although the extension of the term "modal particle" is beyond the scope of the current discussion (See Fretheim , 1981; 1989; 1991; König, 1991; Palmer, 1986) the following definition will be assumed:

> Modal particles are function words that express the speaker's attitude toward the proposition but do not change its truth-condition.

2. "ALTSÅ"

"Altså" can occur in three different positions in a sentence: in initial, central and tag position (see Diderichsen, 1966). I classify "altså" in central position and tag position as a modal particle, as it is a metapragmatic indicator of causal relations in a discourse. "Altså" in clause-initial position functions more like an indicator of the conclusion in a logical argument. It has a more uniform and stable meaning than noninitial "altså". The modal functions of "altså" will be briefly presented in the following.

2.1. Information - seeking Functions

2.1.1. Inference function

"Altså", either in central or tag position, can indicate the speaker's conclusion. The speaker expresses her[1] inference based on information from the previous discourse. "Altså" implies that the proposition of the utterance reflects

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[1] In order to clearify the speaker and hearer in the discussison, a female speaker and a male listener are used.

directly the speaker's interpretation of the given situation, and she asks the hearer for confirmation.

The speaker can have various reasons to believe that the expressed proposition is true, such as linguistic evidence, e.g. newspaper, hearsay, or previous discussion as in example (1), or she can have direct personal experience, for example based on visual perception, as in (2).

(1) A: "Vi hadde virkelig hyggelig; strålende vær, fin badestrand, koselige mennesker på bygda. Hva ellers kan man ønske?"
/We really had a pleasant time; beautiful weather , fine beach, nice people in the village. What else do you need?/
B: "Dere hadde **altså** en ordentlig god ferie?"
/**(So)** you had a really nice vacation?/

(2) A til B som holder på å tenne en sigarett
/B is lighting a cigarette/
A: "Du har **altså** ikke klart å gi opp røyking?"
/**(So)** you haven't managed to give up smoking?/

As (1) illustrates the speaker can have linguistic information leading her to her conclusion. During a discourse A is describing the conditions of their holiday suggesting that they had a great time. Based on this conversation B is able to conclude that A had a nice vacation. Example (2) illustrates inference based on visual evidence. Here the speaker observes the listener smoking, and concludes that he hasn't given up smoking. It is important to add that a certain cognitive condition is assumed: the speaker should have been aware of the fact that B would like to give up smoking in order to be able to draw such a conclusion.

"Altså" helps the addressee recognize the speaker's illocutionary intention, but it is frequently impossible to tell whether the speaker is informing the hearer of a causal relation, or asking the hearer whether a specific contextually inferred causal relation obtains.

2.1.2. Summarizing function

Besides marking inference, "altså" can have the function of summing up what has been said before. It is essentially not possible to completely separate the summarizing function from the inference function, as inference itself is an outcome of consecutive cognitive steps. However, in a conversation the particle can imply that the propositional content of the utterance is a summary of newly gained information.

In written text it is fairly common that "altså" occurs in the last paragraph of a chapter where the author summarizes what previously was written, as in example (3). In this latter function "altså" can only occur in central position.

(3) "Noen av de krav som må være tilfredsstilt for at vi kan si at *nesten* og andre norske dempere er brukt på rett måte, må nødvendigvis defineres som grammatiske restriksjoner, da de for eksempel ikke kan formuleres uten referanse til syntaktiske begreper som utsagnsetning, spørresetning og setning med imperativ verbform. Studier av pragmatiske leksemer er **altså** et grammatikkstudium.

/Fretheim, 1979/

/... The study of pragmatic lexemes is (**consequently**) a grammatic study./

We can see in (3) that the author enumerates his arguments and in the last sentence summarizes his point. His final conclusion (summary) is emphasized by the use of the modal particle "altså".

2.2. Information-giving Functions

2.2.1. Premise-qualifying function

"Altså" can also remind the hearer of previous events or add premises and thus make the conclusion relevant. "Altså" subsumes one or more points from the discourse or from general knowledge and could be paraphrased with expressions such as "as you may remember", "as it is known", etc.[2] With the use of "altså" the speaker tries both to orient the listener so that he understands the utterance correctly, and to verify that the speaker and the listener have a shared context.

Example (4) illustrates "altså" qualifying a premise - the propositional content - for the interlocutor.

(4) A: "Dersom noen leter etter meg, kunne du si fra at jeg kommer tilbake circa om en time."
/In case somebody is looking for me, could you just tell him that I'm coming back in an hour or so./
B: "Ja, men jeg kommer ikke til å sitte her hele tiden, **altså**."
/Sure, but I'm not going to sit here all the time, (**you know**)./

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[2] Another modal particle "jo" has a similar function. "Jo", the so called common ground particle indicates that both the speaker and the hearer have shared knowledge about a topic, therefore "jo" would act as a reminder. (See Fretheim 1991)

The function of "altså" in (4) is to indicate that the positive response should be interpreted on a particular premise: "I'll tell him, but you should know that I'm not going to be present all the time." The implication of "altså" suggests that the speaker wants to make sure that A gets the relevant message.

2.2.2. Premise-specifying function

"Altså" also gives the speaker an opportunity to correct her own utterance, or the hearer, in the event he has not sufficiently considered what the speaker has told him. In the example (5) the speaker is paraphrasing herself, specifying the date of the party more precisely.

(5) "Vi skal ha en avslutningsfest om to uker, **altså** den 14. juni."
/We are going to have a farewell party in two weeks, (**that is**) June 14th/

The causal relation is obvious here too: if the party is going to be in two weeks from today, then it will be on June 14th.

It is difficult to make a clear distinction between these closely related functions of "altså". The previous discussion suggests that "altså" always points to a particular inference in a causal relation. It is realised either in an information-seeking or an information-giving manner. In the first case "altså" appears in a clause with a proposition explicitly expressing the speaker's inference and asking for confirmation, whereas in the second case the speaker has already drawn the conclusion and she offers it to the hearer as a premise. So the difference between the various usages of "altså" is whether the final confirmation is sought or provided by the speaker.

3. "Nemlig"

Whereas "altså" is functionally a rather complex word, indicating a lot of social interactions during the discourse, "nemlig" has a more homogeneous, and restricted pragmatic function. Unlike "altså", it cannot operate in a question - in a request for confirmation. We can distinguish three various usages of "nemlig". The examples below illustrate the functions of "nemlig" - as a modal particle (6), a specifying adverb (7) and a response word (8) - that will be described in the following.

(6) "Sunniva snakker veldig godt spansk. Hun bodde **nemlig** i Mexico i ti år."
/Sunniva speaks Spanish very well. She lived in Mexico for ten years (**you see**)./

(7) "Når det gjelder identifisering av modalpartikler i en diskurs, står vi ovenfor et generelt problem, **nemlig** at partikler utgjør en hybridkategori som rekrutterer sine medlemmer fra ulike ordklasser."
/As far as the identification of modal particles in discourse is concerned, we face a general problem, **(namely)** that particles form a hybrid category that recruits its members from different word classes./

(8) A: "Er det her jeg skal levere bøkene?"
B: "**Nemlig**."
/A: Is it here I should hand in the books?/
/B: **Exactly**./

As a modal particle "nemlig" has the role of pointing out the explanation in a causal relation, e.g. in (6). As a specifying adverb it expands the content of the previous utterance that was said directly before "nemlig" (cf. English "namely"). The speaker offers a more detailed explanation to what was said, as in (7). And finally the response word "nemlig", illustrated in example ((8), gives a positive answer in a way that it justifies that the hearer has come to the right conclusion: "Because it is here you are supposed to hand in the books, you've come to the right place". Thus "nemlig" has some special textlinguistic restrictions that a simple response word "ja" would not have.

Although I propose that "nemlig" can have three different functions, it has to be added that these functions are closely related to each other. The unifying features of these functions are that "nemlig" presupposes a previous speech act to which the word is causally related.

3.1. "Altså" and "nemlig"

When "nemlig" is used as a modal particle it has an explanatory function. This use of "nemlig" demands a special condition: it always assumes an explicit utterance. Example (9) also shows that the same speech participant must be the utterer of the "nemlig" sentence and of the previous utterance which licenses the use of "nemlig".

(9) A: "Sunniva snakker veldig godt spansk."
B: "Hun bodde **altså** i Mexico i ti år."
B: #"Hun bodde **nemlig** i Mexico i ti år."
/A: Sunniva speaks Spanish very well./
/B: **(Well,)** She lived in Mexico for ten years./
/B: #She lived **(actually)** in Mexico for ten years./

With the help of "altså" B develops the train of thoughts that A has begun in (9). B seeks to adjust A's knowledge about Sunniva. B's information can further support A's position and contribute to the right interpretation of A's remark.[3] "Nemlig" as a modal particle can only occur in an utterance where the speaker makes a statement and then justifies it. But it cannot appear in a sentence intended to justify the interlocutor's statement as in (9). "Nemlig" has to be connected to a previous utterance of the same speaker, henceforth the "same speaker constraint".

As I have mentioned above, it is essential that explanatory "nemlig" mark a logical relation between the statement it occurs in, and the utterance that immediately precedes it. That's also the case in (10)a.

(10) a, "Forsiktig! Det er temmelig glatt her, **nemlig**!
Kanskje vi skulle gå tilbake"
/Careful! It's rather slippery here, (**you see**)!
We should probably go back./

(10) b, "Forsiktig! Det er temmelig glatt her, **altså**"
Kanskje vi skulle gå tilbake."
/Careful! It's rather slippery here, (**in fact**)."
We should probably go back./

"Nemlig" justifies the immediately preceding warning. In (10)a the speaker implies that the basis of her message is either from prior knowledge or from realising there and then that the road is slippery. In (10)b the speaker concludes that the ground is slippery. While "nemlig" points backwards to an earlier statement, "altså" pushes the conversation forward. It is directly connected to the forthcoming suggestion to return.

Thus a significant difference between "nemlig" and "altså" is that the two particles have different orientations: "nemlig" refers back to an obligatorily expressed prior speech act, while "altså" looks ahead.

As in the case of other modal particles context plays an important part in the interpretation of "altså" and "nemlig". Examples (11)a and (11)b illustrate that explanatory "nemlig" and information-giving "altså" are used to express causality between two propositions but they approach the topic from two different views.

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[3]Intonation can promote a better understanding of the speaker's attitude. In case A expresses her surprise over Sunniva's excellent knowledge of Spanish, B could use a double focus, accent on "BODDE" and "ÅR" to emphasize the causal relation.

(11) a, "De gikk tilbake. Det var **nemlig** temmelig glatt."
/They went back. It was rather slippery (**you see**)./

(11) b, "De gikk tilbake. Det var **altså** temmelig glatt."
/They went back. It was (**evidently**) rather slippery.")

Using "nemlig" the speaker emphasizes why they went back in (10)a. The use of "altså" in (11)b presupposes that the road conditions are known to the hearer. The speaker assumes that the listener shares her knowledge about the road conditions and confirms the conclusion.

As we have seen, "altså" and "nemlig" indicates two different views of a causal relation. (12)a and (12)b also show that while a "nemlig" sentence is an unqualified statement, an "altså" sentence may be a predictation, or a guess.

(12) a, "Snekkeren drar i morgen.
Han avslutter **nemlig** arbeidet i dag."
/The carpenter leaves tomorrow.
(**In fact**) He is finishing the job today./

(12) b, "Snekkeren drar i morgen.
Han avslutter **altså** arbeidet i dag."/
/The carpenter is leaving tomorrow.
(**So**) He'll finish the job today./

In the first example, (12)a, "nemlig" implies that the speaker gives an account of why the carpenter is leaving the next day. In (12)b "altså" suggests a very different approach. The speaker infers that "Since the carpenter leaves tomorrow, he most likely is going to finish the work today." "Altså" marks the effect, while "nemlig" provides justification or cause. The speaker can justify an action, or the illocutionary force of the speaker's previous utterance.

As was mentioned above "nemlig" can also indicate the justification of the performance of a speech act. Examples (13) and (14) contain questions that are justified in the subsequent statement.

(13) "Har du noen kontakter i Uruguay? Det ligger **nemlig** en fax her som er fra Uruguay, men det er umulig for meg å skjønne hvem som er adressaten."
/Do you have any contacts in Uruguay? There is (**actually**) a fax here from Uruguay, but I can't figure out who the addressee is./

With the question immediately preceding the statement with "nemlig", the speaker uncovers her motivation for asking the question . "If you have contacts in Uruguay, there is a fax which is likely to be for you."

The speaker can draw attention to the matter she is going to tell about using a question (See "expository questions" Sperber & Wilson 1986:251) and by immediately following up the question with a statement including "nemlig", the speaker is justifying the choice of topic for her talk.

(14) "I dag skal jeg snakke om ozonlaget som blir tynnere og tynnere. Hvor farlig det er, er det **nemlig** mange som ikke har skjønt ennå."
/Today I am going to talk about the ozonlayer that is getting thinner and thinner. How dangerouos it is, has (**actually**) been understood only by a few./

"Nemlig" in (14) reflects the connection between the speaker's belief - "a thin ozonlayer means a big danger" - and her motivation for lecturing about it - "there are only a few people who actually realize the danger".

"Nemlig" can offer justification for a directive. An imperative, for example in (15), can mediate a suggestion to the hearer.

(15) "Nå sender vi den siste episoden av NRKs påskekrim. Følg med! Vi får **nemlig** vite hvem som står bak de mystiske hendelser.
/Now we are going to broadcast the last episode of NRK's easter thriller. Stay with us! We'll get to know who's behind the mysterious actions (**you see**)./

The speaker in (15) invites the listeners to follow the programme. "Nemlig" implies the speaker's motivation and justifies the proposition: "you should watch the film because we'll find out ..."

The speaker can address the hearer with a simple vocative as in (16). She addresses the listener by means of a vocative functioning as attention marker and expounds her message afterwards.

(16) . "Du? Jeg blir **nemlig** bortreist i en uke, så derfor så lurte jeg på om du kanskje kunne vanne plantene mine og ta avisa for meg. "
/You? I am going away for a week (**you see**), so I was wondering whether you could possibly water my plants and bring in the newspaper for me./

"Nemlig" indicates that the statement following the vocative accounts for the speaker's requesting the hearer's attention. Then the nature of the speaker's

reasons for addressing the hearer must be expressed, preferably in a clause introduced by "så" marking the causal connection, as shown in (16).

The causal relation between two propositions, one occurring with the explanatory "nemlig", and the other one to be found in the preceding statement, can either be direct as in (17) or just implicated, as in (18). When there is no obvious connection, "nemlig" unambiguously attaches to the sentence expressing the cause in the cause - effect relation.

(17) "Jeg stikker innom postkontoret. Dette brevet må sendes i dag, **nemlig.**"
/I'm going to stop by the post office. I have to mail this letter today (**you see**)./

(18) "Mannen min skal reise bort for noen dager. En gammel tante kommer på besøk, **nemlig.**"
/My husband is going away for a couple of days. An old aunt is coming to visit us (**you see**)./

The speaker's explanation in (17) is not unexpected, on the other hand, in (18) the two propositions are not necessarily connected by a cause-effect relation: "nemlig" reveals that this logical connection is assumed to exist.

"Nemlig" can also refer to something non-verbal that has happened immediately before the utterance containing "nemlig" was produced. In (19) the speaker has been working on something and has just finished. She says :

(19) "Sånn! Da risikerer vi ingen lekkasje, **nemlig.**"
/That's it! Then we risk no more leakage (**you see**)!/

Of particular interest, in (19), is the fact that the propositional content "We risk no more leakage" cannot be understood to reflect the cause of anything expressed in (19). Rather, it is a consequence of the plumbing operation. The cause is reflected in the propositional content underlying the proform "da", that is the anaphoric conditional protasis, and the proposition "We risk no more leakage" is the apodosis of that conditional. The antecedent of "da" is situationally inferred, but the deictic expression "sånn" is needed to license the anaphore "da". We can now paraphrase (19) as "Because I've repaired this, we risk no more leakage."

While "nemlig" always needs an antecedent, it is not obligatory in the case of "altså".

(20) A går løpende mot utgangsdøra
B: "Har du dårlig tid?
A_1: "Ja. Jeg må **nemlig** prøve å nå bussen."
A_2: #"Jeg må **nemlig** prøve å nå bussen."
A_3: "Jeg må prøve å nå bussen, **altså**."
/A running towards the doorway
B: Are you in a hurry?
A_1: Yes! I have to catch the bus (**you see**).
A_2: # I have to catch the bus (**you see**).
A_3: I have to catch the bus, (**you know**)./

In (20) A tells B why she has to hurry. B can see that A is running towards the entrance and presumes that she is in a hurry. A tries to catch the bus and when she is asked she provides adequate information, so that B understands the situation and draws the right conclusion, that is "in order to catch the bus she has to run." In (A_1) "nemlig" can be used because the response word "ja" is present as an antecedent. "Nemlig" does not offer any progress in the discussion, but it signals that the statement is meant to provide an explanation for the speaker's behaviour. However, A_2 is not correct, as it lacks the obligatory immediate antecedent. "Altså" in A_3 has a strong interactive function in the conversation.

As it was illustrated in all the examples above, explanatory "nemlig" demands an immediate antecedent, an utterance or an event: an utterance performed or an action realized by the very same person uttering "nemlig" (same speaker constraint), and the two utterances, actions, can not be interrupted by the other partner in the conversation. (cf. (20) A_2).

A sentence that contains "nemlig" is often interchangeable with a clause introduced by "for"(for) og "fordi" (because). (cf. (21)).

(21) a, "Du kan ikke se på nattkinoen. Du er **nemlig** altfor ung for denne filmen."
/You can't watch the movie tonight. You are much too young for this film (**you see**)./

(21) b, "Du kan ikke se på nattkinoen, **for** du er altfor ung for denne filmen."
/You can't watch the movie tonight **for** you are much too young for this film./

It is also possible to use both "fordi" and "nemlig" in one and the same sentence. In the following situation A and B are preparing for a cruise and B is boarding the ship with his cat in his hand.

(22)A: "Tar du pusen din, og?"
B: "Og hvorfor ikke om jeg tør spørre?"
A: "**Fordi** han er for liten **nemlig**, om jeg må være så fri å svare."
/Tegneserie: "Asterix"/
/A: Will you take your cat with you, too?
B: And why not if I may ask?
A: **Because** it is too small (**you see**), if I may have the liberty to answer./

"Nemlig" in (22) is a cue to the intention behind the question A has posed: "You should not take your cat with you because it is much too small." By the question A indicates her surprise that despite the cat being too small B wants to bring it along. Observe that due to the "same speaker constraint", A's response is not acceptable without "fordi".

(23) provides an excellent example of several usages of "nemlig" and "altså" in written Norwegian. "Nemlig"$_1$ is a specifying adverb that will be described in 3.2. and "altså" acts here in a summarizing function (see 2.1.2.)

(23) "Det norske åpningsinnlegget ble meget dårlig mottatt blant EFs politikere. Ja, Svenn Stray selv likte det dårlig. Nederlands utenriksminister Joseph Luns, senere NATOs generalsekretær, oppsummerte spydig at det hadde vært bare tre innlegg på åpningsmøtet, **nemlig$_1$** det britiske, danske og irske. Han valgte **altså** å overse det norske!

Formannen i EFs ministerråd, Belgias Pierre Harmel, sa noe mer diplomatisk at det norske innlegget inneholdt *overraskende mye om brobygging*. Stray hadde **nemlig$_2$** understreket at *mulighetene for å bygge bro mellom de to vesteuropeiske markedsdannelser* nå var bedre enn på lenge.

/Dagbladet, 10.04.1993/

/The Norwegian opening speech was badly received among the EEC politicians. Yes, Svenn Stray, himself was dissatisfied. J.L.the Netherlands' foreign minister, later NATO's secretary-general remarked sarcastically that there were three speeches at the opening meeting, namely the British, the Danish and the Irish. (**That is**) He preferred to ignore the Norwegian one!

The Belgian Pierre Harmel, chairman of the EEC council of ministers, said something more diplomatic that the Norwegian talk contained surprisingly new "bridge-building". (**The reason was that**) Stray had underlined that the possibilities for building bridges between two West-European markets were better now than for a long time."/

"Nemlig$_2$" has an explanatory function marking a logical relation between the sentence it occurs in and the sentence that precedes it. "Nemlig$_2$" justifies the commentator's judgement that the chairman of the council of ministers is more diplomatic. "Nemlig" in this role illustrates that it can also emphasize causality in argumentative written style.

This section has been concerned with the causality functions of "altså" and "nemlig" and it has been argued that the different communicative intentions of the speaker can be realized with the help of modal particles.

3.2. Specifying "nemlig"

As was suggested in the beginning of section 3, a distinction can be made between an explanatory "nemlig" revealing a causal realation and a specifying "nemlig" that links sentences specifying in detail what was previously said. An example is "nemlig$_1$" in (23) where the writer mentions three proposals and specifies which proposals he actually refers to.

"Nemlig" in a specifying, completing function could be glossed by expressions such as "namely", "in other words" or "more precisely".

(24) a, "Jeg likte den siste episoden best, **nemlig** den som foregår i Afrika."
/I liked the last episode best, **namely** the one that takes place in Africa./

(24) b, "Jeg likte den siste episoden best, **altså** den som foregår i Afrika."
/I liked the last episode the best, (**you know**) the one that takes place in Africa./

Here the speaker refers to a TV-series she saw, the last episode of which takes place in Africa. In (24)a and (24)b "altså" and "nemlig" are more or less interchangeable. Both of them aims to specify, or define more precisely, the first part of the utterance, they signify a certain relation between the first and the second part of the statement. The principle difference between the functions of the two particles is that while "nemlig" can introduce new information to the hearer in the explanatory part of the sentence, "altså" reminds the hearer of something which the speaker believes is already known to him.

In contrast, "nemlig" preserves its explanatory function when the speaker uses a full sentence.

(24) c, "Jeg likte den siste episoden best. Det er **nemlig** den som foregår i Afrika."
/I liked the last episode the best. (**Because**) It is the one that takes place in Africa./

In (24)a the speaker uses the "nemlig" clause to add some more information about the referent of the direct object phrase. However, in (24)c "nemlig" generates the conversational implicature that the speaker takes a special interest in Africa.

Specifying an item means going from a more general notion to a special case subsumed under the general notion The illformedness of (25)b shows that "nemlig" has a strictly specifying function, unlike "altså" which may equally attach to the superordinate term (of (25)c).

(25) a, "Jeg har bestilt hans yndligskake til fødselsdagen hans, **nemlig** dobostorta."
/I have ordered his favourite cake for his birthday, **namely** a dobostorta./

(25) b, #"Jeg har bestilt dobostorta til fødselsdagen hans, **nemlig** en kake."
/#I have ordered a dobostorta for his birthday, **namely** a cake./

(25) c, "Jeg har bestilt dobostorta til fødselsdagen hans, **altså** en kake. "
/I have ordered dobostorta for his birthday, **(you know that's)** a cake./

Dobostorta is a well-known Hungarian cake and when the speaker mentions the birthday cake in (25)a she specifies what type of cake she has in mind. Nevertheless, it would be unacceptable to use (25)b as the logical order of recognition has been reversed: the speaker mentions the more specific term before the more general one. However, as (25)c illustrates "altså" can be used in the same construction if the hearer doesn't know what dobostorta is.

When the speaker is specifying the topic by using a linguistic expression which has the same meaning as the phrase used before the apposition introduced with "nemlig", then "nemlig" is used incorrectly.

(26) a, #"Konserten er 27. desember, **nemlig** tredje juledag."
/The concert is on December 27th, **namely** the day after Christmas./

(26) b, "Konserten er 27. desember, **altså** tredje juledag."
/The concert is on December 27th , **(that is)** the day after Christmas./

In (26)a the speaker refers to the same specific date in December in both clauses, just describing it differently. There is no hyponymy here, no relation between a superordinate and a subordinate concept. In (26)b "altså" acts as a (self)-correcting particle (Compare with 2.2.2.). The speaker is simply rewording her statement.

The phrase that specifying "nemlig" modifies is always assumed to contain information that is new to the hearer; with "altså" there is no asssumption of mutual knowledge. In (27)a the speaker is informing the addressee that her favourite drink is a Scotch. In (27)b on the other hand, the proposition - 'Scotch is my favourite drink' - is expected to be already known by the hearer .

(27) a, A: "Hva vil du ha å drikke?"
B: "Jeg vil gjerne ha min yndlingsdrink, **nemlig** et glass Scotch."
A: "Ja vel. Så du liker whisky."
/A: What would you like to drink?
B: I'd like to have my favourite drink, **namely** a glass of Scotch.
A: Really. So you like whisky./

(27) b, A: "Hva vil du ha å drikke?"
B: "Jeg vil gjerne ta min yndlingsdrink, **altså** et glass Scotch."
A: "Javisst! Jeg burde ha husket det."
/A: What would you like to drink?
B: I'd like to have my favourite drink, (**you know**) a glass of Scotch.
A: Of course, I should've known./

The context is the same both in (27)a and (27)b; A offers a drink to B. What seems to be the difference is, in fact, the modal behaviour of B. In (27)a the speaker indicates that she assumes that her favourite drink is not known to the hearer. However, in (27)b it is quite obvious that A is expected to have the relevant knowledge, and "altså" operates as a gentle reminder.

3.3 "Nemlig" as response word

"Nemlig" as a response word is the vehicle of an affirmative assertion. It cannot be interpreted as a non-truth functional modal particle, yet there is a certain functional resemblance between the response word and the modal particle. It is very interesting to see what exactly makes "nemlig" different from a regular response word "ja" (yes) and what are the features that the response

word "nemlig", explanatory "nemlig" and specifying "nemlig" share. Consider the following examples:

(28) a, A: "Maler du huset selv?
B: "**Nemlig**."
/A: Are you painting the house yourself?
B: **Exactly**./

(28) b, A: "Oppussingen av huset må da bli veldig dyrt?"
B: "Ikke så veldig. Jeg maler **nemlig** huset selv. "
/A: The renovation of the house must be very expensive?
B: Not really. I paint it myself, (**you see**)./

(28) c, A: "Maler du huset selv?"
B: "Ja da. Sånn kan man spare litt, **nemlig** penger til maler."
/A: Do you paint the house yourself?
B: Yep! This way you save a bit, **namely** the painter's money./

The examples in (28) show the three different functions of "nemlig": answer word "nemlig" (a), explanatory "nemlig" (b) and specifying "nemlig" (c). All three functions relate to the speaker's intention to point out a cause - effect relation between two propositions: "The cost of the renovation will not be very high as I'm painting the house myself." As (28)a illustrates "nemlig" as a response word can stand alone with an implicit understanding that: "Yes, it is because the costs of the renovation will be relatively low". Explanatory "nemlig" illustrated in (28)b occurs in central position which is quite usual for modal particles. (Though we often find explanatory "nemlig" in tag position, as well.) However, the specifying function of "nemlig" has a very limited syntactic distribution, it is only used as an apposition to a nominal or an adverbial phrase.

"Nemlig" as response word always demands a special context. What "nemlig" implies is not only a confirmation but it is also a justification of the hearer's assumption or inference. Compare the following examples:

(29) a, A: "Har du vært på Island før?"
B: "Ja."
/A: Have you ever been to Iceland?
B: Yes./

(29) b, B is telling A how fascinated one can be standing next to Gullfoss
A: "Har du vært på Island før?"
B: "**Nemlig**"
/A: Have you ever been to Iceland?"
B: "**That's right.**"/

In (29)a A's question is open and does not require special background information. However in (29)b from the previous discussion A believes that B has already been to Iceland, and that B has probably seen Gullfoss. A could have used "altså" in her question: "Har du altså vært på Island?" B justifies A's assumption and confirms that she has drawn the right conclusion. Compare this with (30):

(30) A: "Jeg skal til Island om en uke. Har du noengang vært der?"
B: #" **Nemlig**."
/A: I'm going to Iceland in a week. Have you ever been there?"
B: #" **That's right**"./

As (30) illustrates "nemlig" cannot be used as a response word unless B refers to a previously expressed proposition in the conversation that actually explains B's positive answer. Thus answer word "nemlig" emphasizes the casual relation between two propositions that have been activated in the discourse.

4. Conclusion

"Altså" and "nemlig" as modal particles are metapragmatic indicators of a cause - effect relation between two propositions. "Nemlig" marks the cause, "altså" the consequence. With "nemlig" there must be an overt representation of the consequence proposition immediately prior to the "nemlig" clause, whereas with "altså" no such constraint obtains.

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BIBLIOGRAPHY

BLAKEMORE, D. (1992) Understanding Utterances. An Introduction to Pragmatics. Oxford: Basil Blackwell

DIDERICHSEN, P. (1966) Helhed og Struktur. København: Gad

FRETHEIM, T. (1979) Demperen "nesten". Maal og Minne pp.182-219.

FRETHEIM, T. (1981) "Ego"-dempere og "alter"-dempere. Maal og Minne pp.86-100

FRETHEIM, T. (1989) The two faces of the Norwegian Interference particle *da*. In H.Weydt, ed. Sprechen mit Partikeln pp. 403-415 Berlin: de Gruyter

FRETHEIM, T. (1991) Formal and Functional Differences between S-internal and S-external modal particles in Norwegian. Multilingua 10.Trondheim

HEGGELUND, K. T. (1981) Setningsadverbial i norsk. Oslo: Novus Forlag

KÖNIG, E. (1991) The meaning of Focus Particles. A comparative perspective London: Routledge

LYONS, J. (1977) Semantics 2. Cambridge: Cambridge University Press

PALMER, F. R. (1986) Mood and Modality. Cambridge: Cambridge University Press

SEARLE, J.R. (1969) Speech Acts. London & New York: Cambridge University Press

SPERBER, D. and WILSON, D. (1986) Relevance. Oxford: Basil Blackwell

A Few Notes on Anatomy and Distinctive Features in NTS Handshapes

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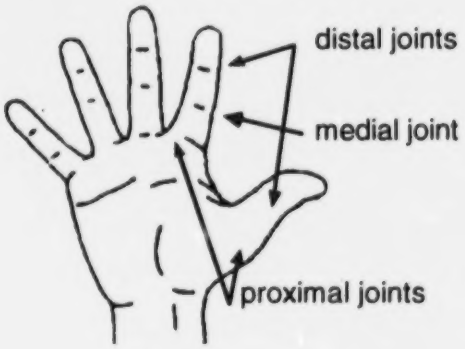
Abstract

The issue addressed here are the features that compose Norwegian Sign Language handshapes. Some of the questions have previously been touched upon in two unpublished manuscripts (Greftegreff 1990, 1991). In addition to this, I seek to bring relevant anatomical facts into the discussion. I also suggest changes in current terminology, based on general phonological and anatomical usage. This work is still rather preliminary. The questions that have not been addressed here are listed in the final section.

Anatomical terminology used in this paper

There are three finger joints and two thumb joints. The **proximal** joint is at the base of the fingers and thumb, connecting to the metacarpal bones. The **distal** joint is the one most distal from the body of the hand, in both fingers and thumb. In addition to this, there is the **medial** joint of the fingers.



The bones connecting the fingers to the wrist are called **metacarpals**. Unlike the bones of the fingers, the metacarpals of the fingers have rather restricted mobility, as they are bound to each other by various connective tissues. In contrast to this, the first metacarpal (connecting to the thumb), has considerable freedom of movement. I will discuss the further details of this below.

The bones in the fingers are called **phalanges**, singular **phalanx**. The joints between the phalanges are called **interphalangeal** joints. The medial and distal joints are both interphalangeal, and the proximal joint is **metacarpophalangeal**.

The muscles that extend or straighten the finger joints are called **extensors**, and the muscles that flex the joints are called **flexors**. Flexion and extension of the different joints are achieved by interaction between the different extensors and flexors of the lower arm, as well as by a number of smaller muscles in the hand. The interplay is quite complex. I will restrict myself to going into the anatomical details only insofar as they are directly relevant for the discussion.

In the following, I will use **abduction** for spreading of the fingers, and **adduction** for bringing the fingers together. The mobility of the thumb metacarpal makes further distinctions necessary. **Opposition** is described in the literature on ASL as the thumb position directly opposite the fingers, as contrasted with the position **laterally** to the side of the palm (ill. below):

lateral (radial) opposed

This is a somewhat unfortunate choice of terminology, concerning the usage of 'opposition' in the sense of 'phonologically contrastive'. For this reason the term will be used only provisionally.

In addition to this, terms are needed to refer to the different parts or sides of the hand and fingers. The inside part will be termed **palmar**, the back **dorsal**. The two lateral sides will be termed **radial** when referring to the thumb edge of the hand, and **ulnar** when referring to the little finger side. In addition to this, I will use the terms **tip** and **base**. Somewhat not very intuitively perhaps, the term tip will also refer to the outer surface of the first phalanges when the hand is closed.

About the illustrations

Where nothing else is indicated, the handshape illustrations are taken from Prillwitz et al. (1989), which contains a large table of handshapes. A few illustrations have been modified to get smaller details correct. The modifications have not improved upon the artistic qualities of the drawings. Wherever this I

have changed the drawings, I have added (mod.). Apart from this, I have added notation symbols and text to some of the handshape drawings.

Features and anatomy

Neutral positions

The following quotation, will be used as a definition of a neutral position handshape, and is taken from a standard work on anatomy:

> In the position of rest the thumb is in contact with or, perhaps more often, close to the lateral border of the palm and the index finger. The rest of the digits are loosely flexed and to a degree increasing from the second to the fifth. The metacarpal heads form an arch, corresponding in its palmar concavity to that of the carpus, at which the hand is about half extended. The whole apparatus, though 'open', is semi-flexed or 'cupped' and ready for any grasping or oppositional effort required of it.
>
> Gray (1980:593)

[Second metacarpal = the index metacarpal. Carpus = the wrist bones.]

The profundis flexor

In gentle, unrestrained flexion, the **flexor digitorum profundis** flexes all the finger and thumb joints, producing the so-called A handshape. The exact thumb position may vary, according to minor muscular adjustments.

A As

Only positions, the maximally distinct, have been discussed in the literature as potentially distinctive. The two variant handshapes produced with different thumb positions are called A and A_S.[1] I have not found the two to be distinctive in Norwegian Sign Language, (NTS[2]). This accords with the analysis of NTS handshapes in Schröder (1984, 1986). Some recent coinages based on the international manual alphabet rely on this distinction, but the relevance for the analysis is quite doubtful. For a discussion, see Greftegreff (1992).

Schröder cites Stokoe (1960) who names contact between the hand and another body surface as a possible factor conditioning the allophony between A and A_S. Whenever there is contact, the thumb will be moved away from the contacting surface and to the other side of the hand. In my opinion this holds only when there is actual contact between the hand and a body surface. Signs with

movement towards a body surface have alternative articulations without final contact. In these alternative articulations the thumb is not necessarily moved away from the "contacting surface". The sign HUSKE ("remember", with movement towards the forehead, closed fist with palmar side facing the forehead) may thus, in the non-contacting variant, be articulated with any of the two thumb positions. The contacting variant will have the A handshape, but not A_S. This supports the hypotheses that the thumb positions are not distinctive, and that contact will block realisations which are otherwise freely allophonic.

The superficialis flexor

Rapid or forceful flexion of the hand involves an additional flexor muscle, the **flexor digitorum superficialis**. This muscle may also act without the co-operation of the profundis flexor. The resultant handshape will be different from both A and A_S as illustrated above. First, the thumb is not flexed. Second, the distal joints of the fingers are not flexed either.

This is shown in the illustrations to the right (adapted from Klima & Bellugi et al., 1979:161 - henceforth K&B). The reason for the difference is that the superficialis flexor, in contrast to the profundis flexor, does not operate on all joints, but only on the proximal and medial joints. In addition, the superficialis only affects the fingers and not the thumb. This produces the bottom handshape to the right. An interesting effect is that the thumb may not move around to the palmar side because of the distal phalanges of the fingers.

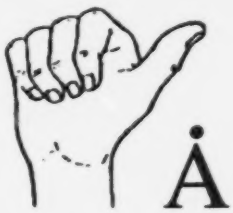
According to K&B, American Sign Language (ASL) and Chinese Sign Language (CSL) differ with respect to which of these handshapes is the more common as a phonetic level realization of the closed handshape. The handshape on the top was found to be the most common in ASL, whereas the handshape on the bottom was the most common in CSL. The experiment also showed that American signers perceived CSL signs as stiff or angular, but were unable to name and reproduce the exact handshape differences when imitating CSL signs. In contrast to this, persons who were naive to sign languages did a more exact reproduction of the CSL handshapes. This indicates that the handshapes are not phonemically distinct in ASL.

An interesting point is that the "stiff" handshape is indeed found in certain contexts in ASL. An example of this is ASL SECRET. This sign is articulated like CSL FATHER.[3]

Ill. from K&B:152.

In this case the thumb does not move away from the contacting surface. On the contrary, the thumb must stay in lateral position. A possible interpretation is that thumb position is, after all, distinctive, but this fits badly with the observed allophony in signs like HUSKE. It also fits badly with the conclusion in the comparative study on ASL and CSL which was cited in K&B.

As indicated above, using the superficialis flexor to close the hand gives the thumb the opportunity to extend separately, forming a different handshape, A-dot (ill.). Sandler (1989) argues convincingly that this handshape cannot be treated as an allophone of A. This position is also taken in Schröder (1986).



Adapted from K&B.

If the handshape in SECRET is an allophone of A-dot, the closed position may be conditioned by the contact at the back of the thumb. This makes the resultant handshape overlap with the lateral thumb allophones of A. In other words, there is no direct mapping from phonological level to anatomical facts. Still, knowing how the hand flexors work may help to bring out phonetic level facts which may otherwise be overlooked, like the flexion, or lack of it in the proximal joint.

From a phonetic point of view at least, the illustration of the A-dot handshape in Klima & Bellugi et al. (1979) is likely to be more typical than the corresponding illustration in Prillwitz et al. (1989) to the right, as the latter shows a handshape which is articulatory more complex, in the sense that the thumb extensors need to counterbalance the effect of the profundis flexor.

Whole and split handshapes - active and passive fingers

In NTS, the extended thumb of the A-dot handshape may contact another body part in several possible ways. The following table shows some examples:

Thumb tip contact:	ALKOHOL ("alcohol" - repeated movement towards chin)
Palmar side of thumb:	SJEKKE ("check" - against palm, clockwise rotation)
Dorsal side of thumb:	SELV ("self" - movement towards chest)
Lateral side of thumb -	radial: ANSVAR ("responsibility" - against chest, downwards movement), ulnar: BERGEN (Norwegian town - against forehead, sideways movement to ipsi-lateral side)
Base side:	FENGSEL ("prison" - hand moves towards wrist of other hand, contact at wrist[4])

A comparable table showing contact with the closed (A) fist:

"Tip" contact:	PROTEST ("protest" - motion towards palmar side of other hand)
Palmar side of hand:	MOT ("courage" - motion towards chest)
Dorsal side of hand:	FOTBALL ("football" - motion towards palmar side of other hand)
Lateral sides of hand -	radial: GUBBE ("old man" - repeated motion towards chin), ulnar: ARBEID ("work" - repeated motion towards top of other hand)

Another logical possibility involves A-dot handshape and contact on other parts of the hand - that is to say, apart from the extended thumb. An example of this is the sign KANSKJE ("maybe") in which the ulnar side of the hand is in contact with the palm of the other hand while undergoing a bi-directional wrist rotating motion. I have not found examples of A-dot handshapes which involve parts of the hand other than the ulnar side. This opens the possibility for another interpretation. The contact on the dorsal side of the hand may be reinterpreted as phonetic level realization of contact on the base side of the extended thumb handshape.

In the closed fist handshape, the hand acts as a whole. In contrast to this, the thumb is more prominent than the other fingers in the A-dot handshape. Contact occurs on the thumb only, and the other fingers fall into a linguistic background. Unlike the whole A-handshape, where all digits share the same feature specification (i.e. closed), the A-dot handshape is split, with thumb and fingers in different positions. A phonological description of NTS handshapes needs to specify the different positions of the fingers in split handshapes.

In the following I shall take the position advocated in Sandler (1989) that handshapes are split into two groups at most, and that on the whole the most extended fingers tend to be more significant linguistically than the least extended. Unlike Sandler, who uses the terms "selected" and "non-selected", I shall use the terms "active" and "passive".

Splitting handshapes

In the above discussion I indicated that the thumb could be split from the rest of the digits by using only the superficialis flexor to flex the fingers. In addition to flexion, the A-dot handshape needs the involvement of the thumb extensors, which makes it an articulatory more complex handshape than the A-handshape.

In general, the muscular work involved in splitting handshapes depends on the work of the extensors as well as the flexors, which will work antagonistically in split handshapes. There are four extensors which extend different fingers. The extensors and the digits they affect are:

extensor pollicis longus	- thumb
extensor pollicis brevis	- thumb
extensor indicis proprius	- index
extensor digiti minimi	- little finger
ext. digitorum communis	- fingers (not thumb)

The index, little finger and thumb thus have separate extensors, but the middle and ring do not. The facts are discussed by Ann (1991, 1992b), who points out the relevance of this for the possible extended fingers, as for instance the rarity of single extended ring finger and single middle finger handshapes across sign languages. The phenomenon was originally reported in Woodward (1982, 1985) but no explanation given.

Due to anatomical factors, the communis extensor spreads the fingers as well as extends them. The spreading effect is noticeable on the index, ring and little fingers, but not on the middle finger, which receives more of a extensory force. In this way, the lack of a separate middle finger extensor is partly compensated for.

In addition to this, the extension of one finger tends to have an effect on the neighbouring finger(s), as pointed out by Ann (1992a) who attributes this to the junctura intertendinae, or intertendinous connexions. The junctura connect all fingers (but not thumb) to the group extensor tendon of the neighbouring finger(s). In the following I will try to go on from the premises laid down in Ann's work in order to give a principled explanation of the different possible handshape splits in NTS.

If the index finger is extended, the extensory force will affect the middle finger as well. The combined force of the index finger extensor and the communis extensor is sufficient to split the index and middle from the rest of the fingers with relative ease. In addition to this, the extended index and middle fingers will tend to be spread. This yields the V handshape.

Conversely, splitting the little and ring finger from the other fingers is relatively more difficult. For one thing, the little finger extensor is less strong than the index extensor, and in addition to this, the communis extensor does not have the necessary effect on the ring finger. Only the little finger may be fully extended, with the ring in an intermediate position.

The following diagrams show the combined effect of the different extensors. The symbols used in it are:

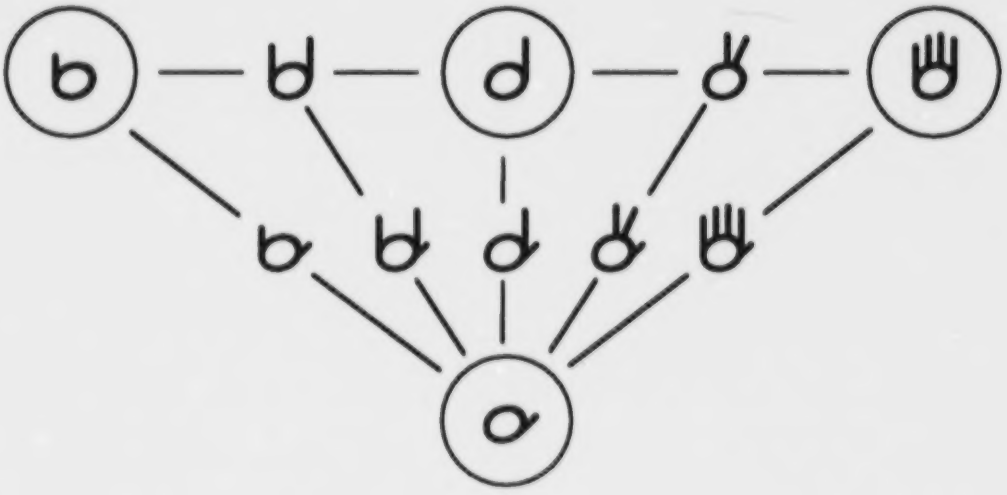
thumb extensors:

index extensor:

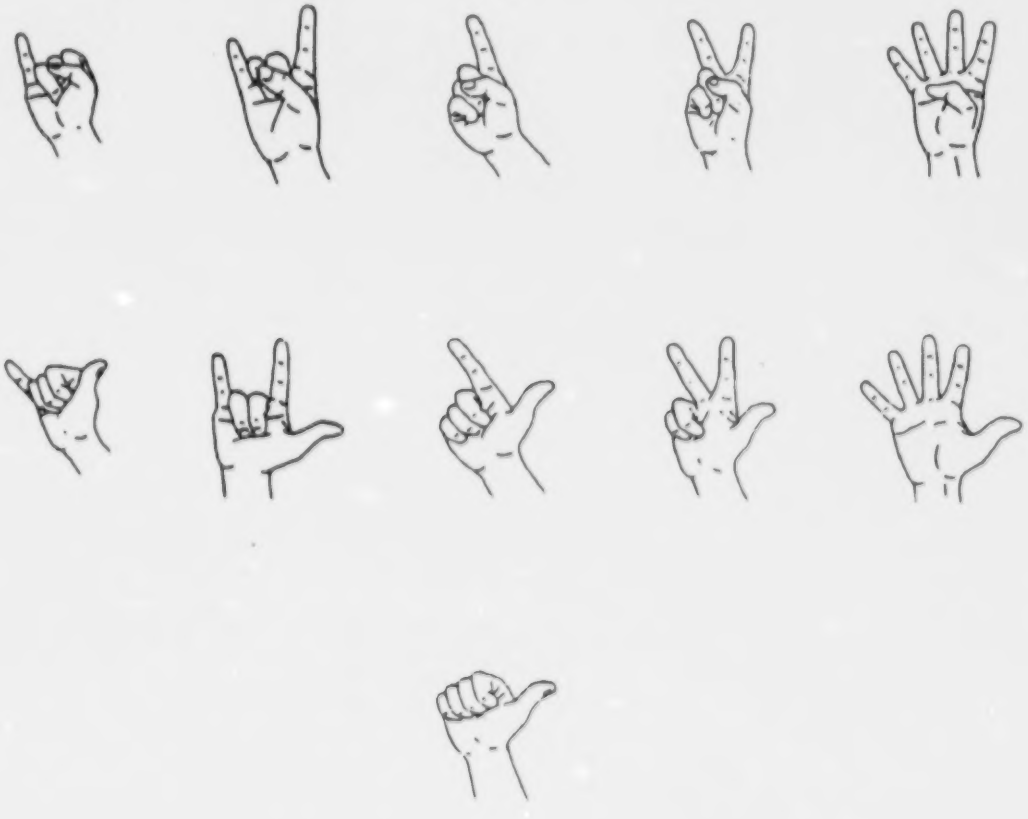
little finger extensor:

common extensor:

The combinations between the extensors (ringed) are:



This yields the following split finger combinations (individual drawings taken from Prillwitz et al., 1989):



This table of split finger handshapes corresponds fairly well to combinatorial possibilities in existing NTS handshapes. It also gives an explanation to the rarity of certain handshapes. For instance, single finger extension of the ring finger or middle finger is not found in the table, as well as the combination of extended little and ring fingers, other fingers flexed.

A note on the handshape inventory in NTS

The handshape with extended index, little finger and thumb, 𝖍 , is not attested in NTS, at least not on a phonemic level. Its absence is probably due to the effect of the intertendinous connections. The extension of index and little fingers have a combined effect on the middle and ring, making the fingers difficult to keep down. This effect is circumvented by using the thumb to keep down the middle and ring fingers in the "horned" handshape 𝖍 . Still, this handshape turns out to be relatively rare in NTS. A great number of signers replace it by the 𝖇 handshape. The replacement of the horned handshape probably relates to two factors. One is visual similarity, and the other is the relative ease of articulation which comes from extending the thumb in place of the index. Unlike index extension, thumb extension does not affect middle finger position.

The absence of a 𝖍 handshape in NTS, may also be due to the similarity to the middle finger handshape (ill.). This handshape is not represented in the table above. It represents an exception to the rule that the most extended fingers are active, because the active finger in this handshape is the middle, and not the other relatively more extended fingers.

(mod.)

Straight vs. curved

In the literature, different terms have been used to describe flexion and extension of the finger joints. The table below is probably not exhaustive:

- No flexion at either joint: Normal position, open, extended.
- Flexed medial joint: Rounded, curved, clawed, bent.
- Flexed proximal joint: Bent, flat.
- Both joints flexed: Closed, bent, flat bent.

In most cases these are holistic terms, in the sense that a term like 'flat' usually translates into two or more features, like 'extended medial joint and flexed proximal joint'.

The discussion in Greftegreff (1991) largely centres on the work of Sandler (1989) where the following distinctive features are used to designate the different finger configurations, or **positions**:

- No flexion at either joint: [+open]
- Flexed medial joint: [+curved]
- Flexed proximal joint: [+bent]
- Both joints flexed: Default value when the finger is unspecified in the underlying representation.

These features are shaped in terms of a distinctive feature analysis, but the features are mutually exclusive. If we add the feature [+closed], which designates contact between fingertips and thumb, we get the following table, where one positive feature automatically will switch three other feature values to a negative:

[+open]	=>	[+open, -curved, -bent, -closed]
[+curved]	=>	[-open, +curved, -bent, -closed]
[+bent]	=>	[-open, -curved, +bent, -closed]
[+closed]	=>	[-open, -curved, -bent, +closed]

In effect, this analysis hardly different from an assignment of combined features like "open", "curved", "bent" and "closed", with "bent" meaning "extended medial joint and flexed proximal joint", etc.

In an alternative analysis David P. Corina (1990) suggests that there are four principal finger shapes, as shown in the table below. In this diagram, the values [+/- bnt] (i.e. bent) refer to flexion of the proximal joints of the fingers, and the values [+/- cur] (i.e. curved) refer to middle joint flexion:

	+ bnt	- bnt
+ cur	closed	curved
- cur	flat bent	open

The analyses of both Corina (1990) and Sandler (1989) suggest that the bent (or flat bent) handshapes are phonemically distinct from the open handshapes. I have not found this to hold for handshapes in NTS. Instead there is extensive allophonic variation between open and bent handshapes (Greftegreff, 1990). The conclusion I arrived at in this paper was that the open and bent handshapes will vary freely, as long as anatomical considerations will permit, but only as long as the orientation of the extended fingers remains constant. To be specific, the fingers should point in the same direction. This is at variance with some currently used notation systems and several theoretical phonological analyses. The issue is discussed again, though not as extensively, in Greftegreff (1992).

If we exclude the closed (i.e. [+bnt, +cur]) position, the relevant distinction is between flat bent and open handshapes on one side, and curved handshapes on the other. The relevant feature distinction is then [+/-cur], which refers to the flexion or extension of the medial joint. In this paper I will use the terminology straight vs. curved, as follows.

Finger extended at medial joint:	Straight.
Finger flexed at medial joint only:	Curved.
Finger flexed at proximal joint only:	Straight.

Open vs. closed

An interesting point is how to define the position 'closed', which Corina (1989) defined as the combination of 'bent' and 'curved'. I suggest the following:

Finger flexed at medial and proximal joints:	Closed.
Finger flexed at medial and distal joints:	Closed.
Finger flexed at all three joints:	Closed.

In split handshapes, the passive fingers are closed and the active fingers are either curved or straight. This makes for a possible three-way division between 'closed', 'curved' and 'straight'. Instead I suggest that there are two phonological level features, [+/- closed] and [+/- straight], the latter corresponding to the positions 'straight' vs. 'curved'.

The features are not independent of each other. The opposition [+/- straight] is possible only with the value [- closed]. This is to say that both [+ straight] and [-straight] carry no meaning in the context [+ closed]. In addition to this, clos-

ing movement, defined here as the transition to [+ closed] is a neutralising context. Closing the hand to a fist from [+ straight], or closing from [- straight] will not produce any minimal pairs. The closing movement is thus the transition from [- closed] to [+ closed], with the initial stage being unspecified as to the value [+/- straight]. Another context in which [+/- straight] is neutralised is in the specification of the thumb position. This is dealt with in the next section

The anomalous thumb

If we define [+/- straight] as a medial joint feature, an interesting problem arises. As pointed out above, the thumb has no medial joint. The question is whether there are any handshape descriptions which need to make specific reference to a curved thumb, or to flexion of the thumb. The A-dot handshape is the only handshape where the thumb is the only extended digit. There is no curved thumb handshape in opposition to this straight thumb handshape. In all other contexts, the thumb takes its specification along with the fingers.

The thumb is flexed at the distal joint if the active fingers are curved, and extended at the distal joints when the active fingers are straight. In lateral position the thumb tends to be extended at the distal joint, regardless of the curvedness/straightness of the active fingers.

In addition to this, a lateral position tends strongly to block flexing of the thumb, i.e. flexing as a movement and not just as a position. Greftegreff (1991) discusses NTS signs where the active index finger flexes, but where the thumb remains straight. The sign SKYTE ("shoot") starts with straight (or nearly straight) index and thumb. The index flexes, but the thumb remains extended. In Greftegreff (1989) this sign is discussed as one of several phonetic level violations of a hypothesis put forth in Mandel (1981) and accepted in Sandler (1989), stating that the fingers can be split into two groups at most, and that the fingers within either group must be in the same position.

Specifically, if flexion is described as the transition from [+open] to [+curved], as in Sandler (1989), the final configuration of SKYTE represents a violation of the principle that all fingers must be in one of maximally two different positions. An ASL example involving flexing of the extended index and middle, but where the thumb remains stationary is the sign DEVIL (ill.).

DEVIL - ill. from K&B.

A way to avoid this problem is to state simply that the feature distinction curved vs. straight is irrelevant to the description of the thumb position. Still, the question remains why the thumb reflects the curvedness of the active fingers in opposed position, but not in lateral position.

The answer to this lies in the function of the extensor pollicis longis. Unlike the tendon of the extensor pollicis brevis, which runs straight down from the thumb past the wrist, the tendon of the extensor pollicis longus crosses diagonally and runs across the dorsal side of the wrist, ending high on the ulna. The first action of the extensor pollicis longus is to pull the thumb away from neutral position and swing it into line with the fingers. The second function of this extensor is to extend the distal joint of the thumb. The more lateral the thumb position, the stronger the extension. Conversely, when the thumb is opposed, the effect of the longus extensor is rather weak, because the extension is done mainly by the brevis extensor and the **abductor pollicis brevis** (see the section *"Opposition"* below).

"Opposition"

In the introduction, I stated that there are two distinctive thumb positions, opposed and lateral. I also indicated that the choice of term is unfortunate because the term has another meaning within general phonological theory. As an illustration, taken from a previous draft: "The opposition between opposed and lateral thumb becomes neutralised when the metacarpal joint of the thumb is flexed. In other words, the opposition is relevant only when the thumb is extended."

Quite apart from this, the term is unfortunate from an anatomical point of view.

The muscular action that "draws the thumb forwards in a plane at right angles to the palm of the hand and rotates it medially" Gray (1980) is accomplished by the abductor pollicis brevis. When the thumb is extended by the brevis extensor and the abductor pollicis brevis (and rotated as well), the result is the thumb position to the right (ill.).

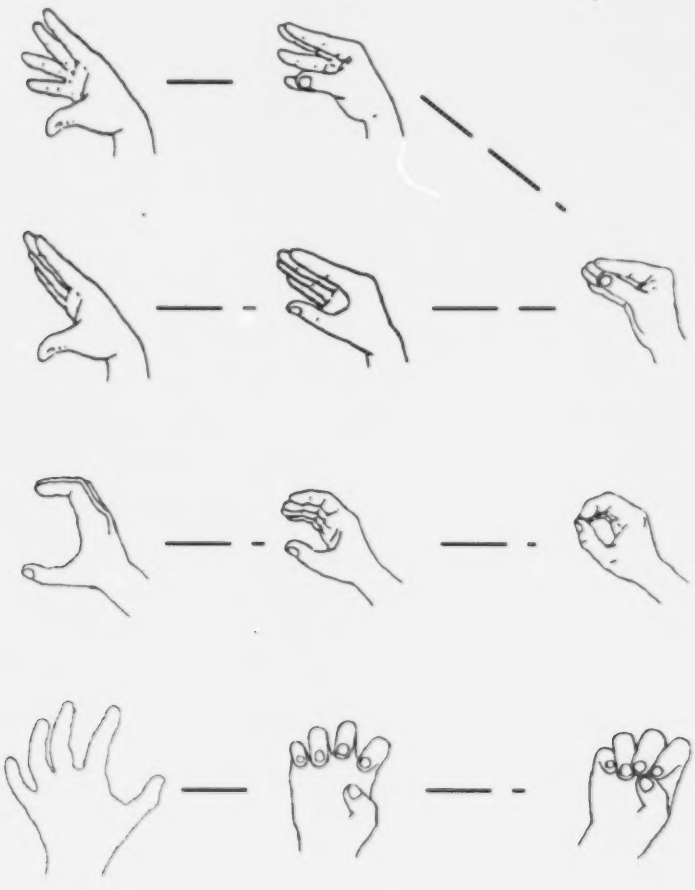
Thumb opposition, in the proper sense, is accomplished by the **opponens pollicis**:

> The opponens pollicis flexes the metacarpal bone of the thumb, i.e. bends it medially across the palm, and rotates it medially (p. 471). By this combination, which is termed opposition, the palmar ('pulpal') surface of the terminal segment of the thumb can be brought into contact with corresponding parts of any of the fingers. [...] During opposition of the thumb, the fingers are flexed at their metacarpophalangeal joints, and to a variable degree of their interphalangeal joints. Thus the thumb may contact any part of the palmar surface of the finger from base to tip.
>
> Gray (1980:587)

What is described here is exemplified by the transition from the first to the second handshape below:

According to common usage within the field of sign language phonology, both handshapes illustrated above are 'thumb opposed'. The transition between the first and second has been called 'closing', and defined as the transition from 'open' position to 'contact' (or 'closed'). The problem is that in anatomy 'opposition' is not a thumb position but a grasping action involving the thumb and fingers. It may thus be a good idea to get rid of the term 'opposition' altogether, or else, to start using it in the proper sense of the word. In the following, I will use the terms 'palmar position' and 'palmar aperture' in opposition (!) to 'lateral position' and 'lateral aperture'. The term 'palmar position' (or 'palmar side position') replaces 'opposition'.

As for palmar (side) aperture, Greftegreff (1991) concludes that there are three distinctive degrees of aperture between fingers and thumb, as shown in the following table, where aperture combines with the features [+/- straight] and [+/-adducted]. That the opposition between adducted and abducted positions is neutralised when the proximal joint is flexed fully, is seen where two rows converge (for an explanation of this, see Ann, 1992a):

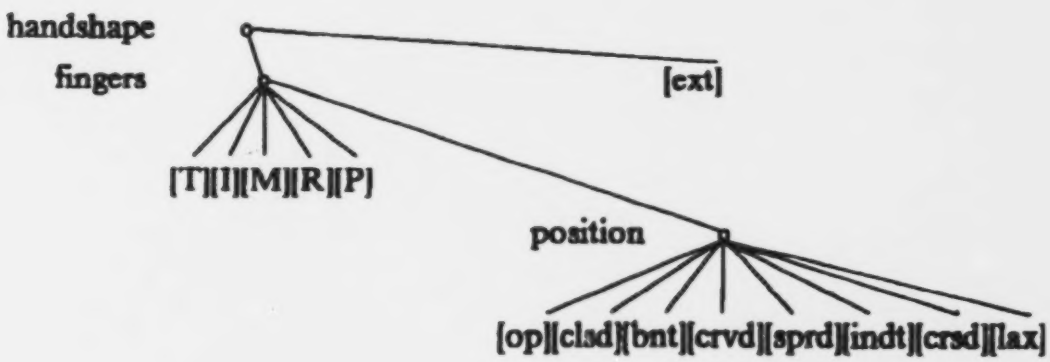


The above table also shows how thumb flexion is straightforwardly predictable from finger curvature and palmar position. Another point which is brought out is that the distinction between 'curved' and 'straight' is independent of aperture.

Two kinds of features

The palmar aperture described above refers to the interrelationship between thumb and finger position. In contrast to this, the [+/- closed] feature discussed previously referred to individual finger extension and flexion. These are two dimensions of aperture which need to be kept separate. The feature [+/- adducted] may be viewed as another aperture feature, as might, for the sake of argument, [+/-straight]. What has to be kept in mind is that these are different dimensions of aperture distinctions which interact to create different handshapes.

The features that go into the splitting of handshapes belong to a different order altogether. This generalisation is captured in Sandler (1989) which groups the two different kinds of features under two separate nodes, the finger node and the position node:



From Sandler (1989)

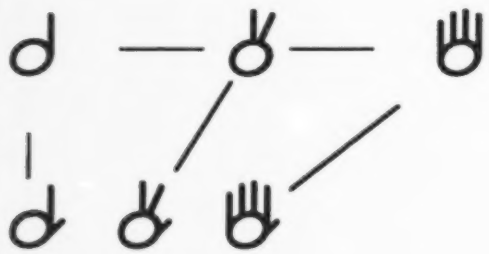
Interrelations between features

Ann (1991) argues that a weakness with this model and some others is the lack of co-occurrence restrictions. The quality of being active ('selected') or passive is specified for each finger individually. The thrust of both Ann (1991) and the present work is that this does not accord with anatomical or phonological facts

about handshapes. Specifically, handshapes may not be split in any way with equal facility.

In addition to this, some features under the position node are clearly dependent on other features under the finger node, but again, the restrictions are not brought out by the model.

Abduction of the fingers is dependent on extension in the proximal joint. Ann (1991) also discusses the feature 'curved' in relation to which fingers are selected, and makes some suggestions. I have looked into the NTS data, which show that only the active finger groups illustrated below may show a [+/- straight] opposition:



I have already stated that the A-dot handshape has no curved counterpart. In addition to this, it turns out that all handshapes where the little finger extensor (ᴐ) is active may not be curved, or flex, either. The combinations which may take part in palmar aperture are the following only (ill.)

along with the anomalous extended middle handshape. The aperture of the latter can only be open or closed, i.e. there are not three degrees of aperture. Again the feature opposition [+/- straight] is not relevant for the extended middle handshape.

If we go on to ask which of these may also be [+ adducted], only one remains:

Conclusion

My brief acquaintance with anatomy starting only this summer has turned out to yield very interesting results. Phenomena which earlier appeared quite idiosyncratic to me have turned out to have a physiological basis.

The connection between anatomical fact and phonological description will newer become straightforward, however. For instance, if we count the metacarpal bones, no less than 36 different muscles may modify the position of one finger. But hopefully, we may overcome a stumbling block of sign language phonology; that we think we can just see all that happens in the articulation of the sign and need not look further.

A list of things to do

This article does not discuss the lateral aperture of the thumb. It does not discuss the hand internal movements called wiggling and crumbling. The oppository movement of the ulnar side of the hand, in combination with thumb laterality or palmarity has not been discussed.

The article hints that hand internal movements like closing and flexing arise from changes in feature values, but does not demonstrate that this is a better analysis than treating the movements as movement primitives.

FOOTNOTES

1 The terminology refers to the American one-handed manual alphabet, where these handshapes correspond to the letters A and S, respectively.

2 NTS = Norsk tegnspråk, Norwegian Sign Language.

3 A similar sign in NTS is ISKREM ("ice-cream"). This sign has a slight downward movement as well.

4 At least two or three variants appear to be possible, depending on which way the hands are turned, or oriented.

REFERENCES:

Ann, Jean. 1991. Constraining sign language handshapes: Towards a phonetically grounded account of handshapes in Taiwan Sign Language and American Sign Language. *WECOL, 1991.*

Ann, Jean. 1992*a*. Physiological Constraints in Taiwan Sign Language Handshape-Change. *Nordic Journal of Linguistics*, 15, 143-157.

Ann, Jean. 1992b. Physiological constraints on two-finger handshapes. *Chicago Linguistic Society.*

Brennan, Mary. 1990. *Word formation in BSL.* Stockholm: University of Stockholm.

Corina, David P. 1989. Handshape assimilation in hierarchical phonological representation. Ceil Lucas ed.: *Sign language research: Theoretical issues.* Washington, D.C.: Gallaudet University Press.

Gray, Henry. 1980. *Gray's Anatomy.* 36th ed. Edinburgh: Churchill Livingstone.

Greftegreff, Irene. 1990. *Hånd-konfigurasjoner i norsk tegnspråkfonologi.* Unpublished manuscript. Trondheim: University of Trondheim, Department of Linguistics.

Greftegreff, Irene. 1991. *Håndformer & håndformendringer i norsk tegnspråk. En innledende undersøkelse av foneminventaret.* Unpublished cand. philol. thesis. Trondheim: University of Trondheim, Department of Linguistics.

Greftegreff, Irene. 1992. Orientation in Indexical Signs in Norwegian Sign Language. *Nordic Journal of Linguistics*, 15, 159-182.

Klima, Edward S., Ursula Bellugi et al. 1979. *The signs of language.* Cambridge, Mass.: Harvard University Press.

Mandel, Mark. 1981. *Phonotactics and morphophonology in American Sign Language.* University of California, Berkeley. Unpublished dissertation,

Prillwitz, Siegmund et al. 1989. *HamNoSys: Version 2.0: Hamburg Notation System for Sign Languages: An Introductory Guide.* Hamburg: Signum Press.

Sandler, Wendy. 1989. *Phonological representation of the sign.* Foris Publications in Language Sciences, 32. Dordrecht, Holland: Foris.

Schröder, Odd-Inge. 1984. *Noen minimale par fra foneminventaret i norsk tegnsprog.* Unpublished manuscript.

Schröder, Odd-Inge. 1986. *Den fonologiske struktur i norsk tegnsprog (NTS). Rapport 1: Artikulator.* Unpublished manuscript.

Stokoe, W. C. 1960. Sign language structure. *Studies in Linguistics - Occasional Paper 8.* Revised edition published as a separate volume: 1978. Silver Spring, MD: Linstok Press.

Woodward, James. 1982. Single finger extension. For a theory of naturalness in sign language phonology. *Sign Language Studies 37,* 289 - 304.

Woodward, James. 1985. Universal constraints on two-finger extension across sign languages. Sign Language Studies 46, 53 - 72.

A Note on Ternary Stress in Sentani*

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One recent line of research in metrical theory pursues the accommodation of ternary stress patterns by theories which allow maximally binary constituents (Hayes, forthcoming, Kager, to appear, Rice 1992). Rice 1992 proposes that ternary alternations be derived by allowing a bimoraic head to be satisfied either by one heavy syllable or two light syllables. In the latter case, the maximal foot will be trisyllabic since the head will be disyllabic and the nonhead will be monosyllabic. A disyllabic head, however, does not show stress on both syllables, but simply on one; hence, the theory includes not only a parameter specifying the headedness of the foot, but also one specifying the headedness of the head. These two parameters suggest four possible foot types, given in (1); parenthesis delineate feet, brackets delineate heads. A capital "M" denotes a stressed mora.

(1)

	MAXIMAL FOOT	FOOT	HEAD
a.	([M m] m)	L	L
b.	([m M] m)	L	R
c.	(m [M m])	R	L
d.	(m [m M])	R	R

Type (1a) is a left-headed foot with a left-headed head. This is the structure which Dresher and Lahiri 1991 have christened the *Germanic Foot*, cf. Rice, in prep. Type (1b) is a left-headed foot with a right-headed head, a foot type which Rice 1992, 1993 argues is the correct foot for analyzing Chugach (Leer 1985a,b,c). To this point, types (1c) and (1d) remain unattested. In this note, we argue that the ternary stress system of Sentani shows a pattern which is derived with foot type (1c).[1]

Following the discussion of Sentani in Hayes, forthcoming, we first note that Sentani has final main stress when the final syllable is heavy, otherwise it has penultimate main stress, as seen in (2). (There appears to be no vowel length distinction in Sentani; closed syllables attract stress and are therefore treated as heavy, or bi-moraic. In the following schemata, lower case letter

* This note represents work in progress and is based on the Sentani data in Hayes, forthcoming; I have not yet had the opportunity to examine the references Hayes cites. I would like to thank Harry van der Hulst for bringing this case to my attention and for helpful discussion. Responsibility for the content of the note is mine alone.

[1] The primary source which Hayes, forthcoming, cites for Sentani is Cowan 1965. Secondary sources are Elenbaas 1992, and Elenbaas and Kager, forthcoming.

represent unstressed heavy (h) and light (l) syllables, while capital letters represent stressed heavy (H) and light (L) syllables. Periods mark syllable boundaries.)

(2)

a.	lH	fa.lQɛm	'head'
b.	Ll	yoɛ.ku	'dog'
c.	Hl	kaɛm.bi	'neck'
d.	lLl	ho.koɛ.lo	'young'
e.	lHl	u.kQɛw.nQ	'he told him'

The iterative ternary alternation in this language is seen in the longer forms in (3). The rightmost stress in the word is primary; all others are secondary.

(3)

a.	LllLl	Q∞.dQ.ka.waɛ.le	'I saw thee'
b.	lLllLl	a.di∞.lQ.mi.hiɛ.be	'you two will collect them'
c.	lHllLl	ha.bQ∞w.no.ko.kaɛ.le	'I struck him (aor.)'

The data in (4) show a double upbeat, i.e., two consecutive unstressed syllables.

(4)

a.	llH	ha.ba.kaɛy	'tobacco'
b.	llLllH	a.di.lQ∞.dQ.mi.hiɛm	'let me collect them'

The data in (5) illustrate surface binary alternations, which must also be correctly derived. Clearly, the binary alternations are due to the position of the heavy syllables in these forms.

(5)

a.	lHlLl	ha.bQ∞w.do.koɛ.ke	'he hit me (aor.)'
b.	lHlHl	Q.na∞y.ne.wQɛn.de	'they (pl.) will go tell him'

The patterns in (6) show that a heavy syllable is not stressed when the subsequent syllable is stressed. Such heavy syllables will be footed as heads, but the absence of stress suggests a clash resolution rule deleting the first of two feet when the heads of those feet are adjacent.

(6)

a.	hH	an.k´ɛy	'ear'
b.	hLl	how.boɛ.ke	'he killed (something)'
c.	hHl	hon.kQɛw.nQ	'he burnt him'
d.	lhHl	ho.nQm.boɛn.de	'he will kill (s.t.) for him'
e.	lHlhHl	Q.na∞y.nQ.k´n.siɛn.de	'they will throw it away'

Having seen data illustrating the distribution of stress, our analysis is summarized in (7).

(7) Sentani footing
a. Foot type: 1c, (m [M m])
b. Construct feet from right to left,
c. Remove the leftmost of two feet when their heads are adjacent,
d. End Rule: Right (cf., Prince 1983).

The syllables which are potentially stressed are selected by applying (7a,b). Note that the assignment of foot type (1c) to a final HL sequence, as in (2c,e), (5b) and (6c,d,e), leaves the L unfooted. This L is itself inadequate to form a bimoraic head. Drawing a second mora for the head from the penultimate H would violate *syllable integrity* (Harms 1981, Rice 1988). Following Mester, to appear, the final light syllable in such a configuration is said to be *prosodically trapped*. Initial light syllables can also find themselves prosodically trapped, as in (4b). Illustrations of these cases are given in (8).

As noted in (6), stress on a heavy syllable which is followed by a stressed syllable is prevented by (7c). Finally, the distinction between primary and secondary stress is represented by applying (7d), following the practice in recent templatic theories such as those in Hayes, forthcoming, and Kager 1989.

The footing procedure in (7) is yields structures such as those in (8). Note that a bimoraic head is obligatory while a monomoraic non–head is optional. Footing is represented with the form given in (1c). The application of (7d) is represented with an asterisk over the foot which receives primary stress.

(8)

a. (2a)	* (m [Mm]) fa. lQ¢m	e. (4b)	* m (m [M m]) (m [Mm]) a. di. lQ∞. dQ. mi. hi¢m
b. (2d)	* (m [M m]) ho. ko¢. lo	f. (5a)	* (m [Mm]) (m [M m]) ha. bQ∞w. do. ko¢. ke
c. (3b)	* (m [M m])(m [M m]) a. di∞. lQ. mi. hi¢. be	g1. (6a)	 ([Mm])([Mm]) an. k´¢y
d. (2e)	* (m [Mm]) m u. kQ¢w. nQ	g2.	* mm ([Mm]) an. k´¢y

The structures given in (8) illustrate various effects of the footing procedure in (7). The form in (8a) illustrates a word which corresponds to one full foot in which the stressed syllable is a heavy syllable. In (8b), the head of the foot is disyllabic, leading to stress on the penultimate syllable, since the head of foot type (1c) is itself left headed. The longer form in (8c) consists of two full feet. Final prosodic trapping is shown in (8d), while initial prosodic trapping can be seen in (8e). The binary alternations in (5) are represented in (8f). Finally, (8g1) and (8g2) show two stages in the application of (7) to (6a). Specifically, the application of (7a,b) in (8g1) results in two adjacent heads. The leftmost of these two heads is removed by (7c), resulting in the form in (8g2). In both prosodic trapping and clash resolution, the moraic content of the syllables is unaffected; rather these morae are simply left unfooted.

It is hoped that a more comprehensive investigation into the phonology of Sentani will provide greater insights into the metrical system of the language. For example, there may be aspects of the segmental phonology which are most straightforwardly described with reference to metrical structure, revealing what has been called the *metrical coherence* of the language, (Dresher and Lahiri 1991, Rice 1993).

This preliminary investigation has been limited to the stress patterns of Sentani, which display iterative ternary alternations. The only foot in (1) which correctly predicts the locations of these stresses is (1c), a foot type previously unattested in research on the foot inventory proposed in (1), (Rice 1992). To the extent that this analysis is subsequently corroborated by additional evidence from Sentani, we take it as further evidence for this typology and for the possibility of the disyllabic head.

REFERENCES

Cowan, Hendrik J. 1965. *Grammar of the Sentani language*. Verhandelingen van het Koninklijk Instituut voor Taal–, Land–, en Volkenkunde 47. The Hague: Martinus Nijhof.

Dresher, Elan and Aditi Lahiri. 1991. Metrical coherence in Old English: the Germanic foot. *Linguistic Inquiry* 22: 251–286.

Elenbaas, Nine and René Kager. forthcoming. Stress in Sentani.

Elenbaas, Nine. 1992. Master's thesis, Rijksuniversiteit te Utrecht.

Harms, Robert. 1981. A backwards metrical approach to Cairo Arabic stress. *Linguistic Analysis* 7: 429–450.

Hayes, Bruce. forthcoming. *Metrical stress theory: principles and case studies.* Chicago: University of Chicago Press.

Kager, René. 1989. *A metrical theory of stress and destressing in English and Dutch,* Doctoral dissertation, Rijksuniversiteit te Utrecht, and Dordrecht: Foris.

Kager, René. to appear. Alternatives to the iambic/trochaic law. *Natural Language and Linguistic Theory.*

Krauss, Michael. 1985. *Yupik Eskimo prosody systems: descriptive and comparative studies*. Fairbanks: University of Alaska.

Leer, Jeff. 1985a. Evolution of prosody in the Yupik languages. In Michael Krauss 1985, pp. 135–157.

Leer, Jeff. 1985b. Prosody in Alutiiq. In Michael Krauss 1985, pp. 77–133.

Leer, Jeff. 1985c. Toward a metrical interpretation of Yupik prosody. In Michael Krauss 1985, pp. 159–172.

Mester, R. Armin. to appear. The quantitative trochee in Latin. *Natural Language and Linguistic Theory.*

Prince, Alan. 1983. Relating to the grid. *Linguistic Inquiry* 14: 19–100.

Rice, Curtis. 1988. Stress assignment in the Chugach dialect of Alutiiq. In *CLS* 24.

Rice, Curtis. 1992. *Binarity and ternarity in metrical theory: parametric extensions.* Doctoral dissertation, University of Texas, Austin.

Rice, Curtis. 1993. Metrical coherence in Chugach. Ms., University of Trondheim.

Rice, Curtis. in preparation. Optimizing the Germanic foot. Ms., University of Trondheim.

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A Dependency Phonology Analysis of Some Aspects of the Saami Language

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Chapter I: THE CONSONANTS

1. Plosives

The Káráwjohka inventory contains phonemically distinct preaspirated /hp ht hk/ plosives and non-aspirated voiceless /p t k/ plosives. Further, glottal stops [ʔ] are phonetically realized. Some linguists, such as Nielsen (1926), have chosen to refer to the preaspirated segments /hp ht hk/ as devoiced plosives [b̥ d̥ g̊]. It appears that, phonetically, voiceless and devoiced plosives are in opposition.

> *Plosives can be pronounced half-voiced or devoiced in the Saami dialects spoken in Norway and Sweden. This is a direct influence of the phonological systems of these two languages. (Korhonen 1981, 127)*

Phonologically, however, I consider the preaspirated and non-aspirated plosives to be in opposition (i.e., phonemically distinct).

This analysis will begin with a list of the environments in which the preaspirated and non-aspirated voiceless plosives are found ([ə] = is a phonetically realized schwa occuring between a non-homorganic sonorant and plosive in a consonant cluster of grade III):

(1)

(a) word-initial				
[p t k] __#	(i) [p]	/pierkːu/	[**p**erəku]	*'meat'*
(b) word-final				
[hp ht hk] __#	(i) [ht]	/tiehti**t**/	[tiehti**ht**]	*'to know'*
(c) word-internal	(i) [hːp]	/oa**hːp**aht/	[oa**hːp**aht]	*'to learn'*
geminates	[hp]	/oa**hp**aːn/	[oa**hp**aːn]	*'I learn'*
	[p]	/goː**p**iht/	[goː**p**iht]	*'depression'*
	[pː]	/nu**pː**ij/	[nu**pː**ij]	*'other'*
	[hpː]	/nu**hpː**it/	[nu**hpː**iht]	*'others'*
preaspirated	(ii) [hk]	/mierːh**k**a/	[mierə**hk**a]	*'mark'*
plosives	[k]	/mierh**kː**a/	[mierh**kː**a]	*'mark'-acc.*
non-aspirated	(iii) [k]	/pierː**k**u/	[perə**k**u]	*'meat'*
plosives	[k]	/pier**k**ːu/	[pier**k**ːu]	*'meat'-acc.*

The above consonant clusters seem to be governed by many independent rules, but the above phenomena can actually actually be reduced

into one rule. Before stating this rule, a more detailed description of (1) is required. In (c.i), the preaspirated plosives have three lengths underlyingly, /h:p/, /hp:/ and /hp/. Non-aspirated plosives are found to have two lengths underlyingly, /p/ and /p:/. A closer look at (c.ii) and (c.iii) shows that if, underlyingly, a long sonorant precedes a short plosive, then a schwa is phonetically realized after the long consonant. However, if a short sonorant precedes a long plosive, schwa is not phonetically realized. As in (c.ii) [mieɽk:a], the short consonant becomes devoiced if the plosive is phonologically preaspirated-i.e.,the unilaterally dependent |V| is lost. But, as (c.iii) [pierk:u] shows, if the plosive is not phonologically preaspirated, the preceding consonant does not become devoiced.

Devoicing in (c.ii) and (c.iii) needs to be accounted for. In Anderson and Ewen (1987), a process is cited for devoicing in Icelandic, as proposed by Àrnason has proposed for Icelandic (Anderson and Ewen, 1987: 195-8) This process is also relevant for Saami. In Icelandic, post-aspirated plosives are underlying in consonant clusters, but if a continuant follows this plosive, the consonant becomes devoiced. This process in Icelandic (2) mirrors the above example [mieɽk:a]:

(2)

/t^{h}it^{h}ra/	[t^{h}itra]	*'to shiver'*
/t^{h}vi:svar/	[tf i:sfar]	*'twice'*

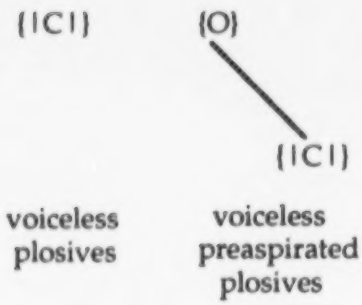
Since Icelandic has underlying post-aspirated plosives, the proceeding consonant will be devoiced. In Saami, however, the following consonant will be devoiced since preaspirated plosives are underlying. Hence, the direction of application is simply due to the phonological inventories (i.e., right to left application for postaspirated and left to right for preaspirated segments).

The first task is to represent the pre-aspirated and the non-aspirated plosives as well as the glottal stop. Since the glottal stop is not found underlyingly, it will not have an articulatory gesture. At the surface, it will be characterize as {|C;|}. In order to differentiate the phonological opposition of the plosives, the component of GLOTTAL OPENING {O} is necessary.

> *The |O| component can be used phonologically in languages (In three way oppositions of phonation-type, in a voicing opposition amongst sonorants and in the distinctive use of aspiration). (Anderson and Ewen, 1987: 195)*

So, {O} becomes more prominent as the degree of glottal opening and aspiration increases (i.e., other components become more dependent upon {O}). The voiceless plosive are represented underlyingly without {O} because it is neither aspirated nor voiced. On the other hand, {O} will govern {|C|} in the underlying structure of the preaspirated plosives.

(3)



In addition to the articulatory gesture, the categorical gesture must be taken into account in order to represent the plosives phonologically.

(4)

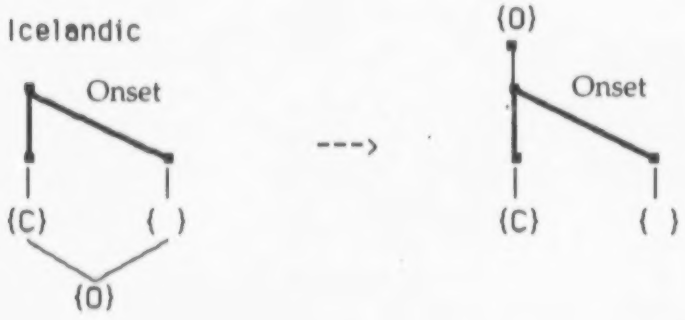
bilabial	alveolar	velar	glottal
{|u|}	{|l|}	{|l,u|}	—

The phonemic inventory can be deduced from (3) and (4), and it is presented below.

A rule for devoicing in (1.c.ii) should now be proposed. Àrnason proposes the following representation to characterize devoicing in the Icelandic examples shown in (2). He states,

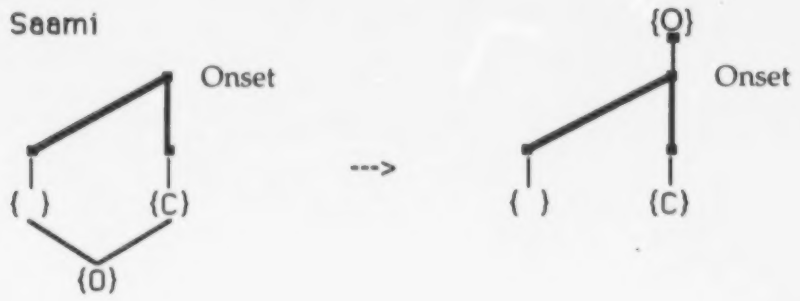
> *In the course of the derivation of the appropriate surface forms for the clusters, the |O| component must lose its segmental status and become prosodic. This is shown by the fact that only one segment in a cluster may be phonetically aspirated, preaspiration or devoiced. Thus, the derivation must involve three stages: lexical association of |O| with a particular segment, the creation of extrasegmental status for |O|, and finally, unique association of |O| with the appropriate segment for phonetic realisation....The third stage-the specification of the phonetic realization of the |O| prosody involves association with the most sonorous element of the cluster forming the domain of the prosody, i.e. its governor...Thus, we have here a case in which |O| characterises aspiration lexically, but may be realized as devoicing of a lexically voiced sonorant consonant. (Anderson and Ewen, 1987: 197-8)*

(5)



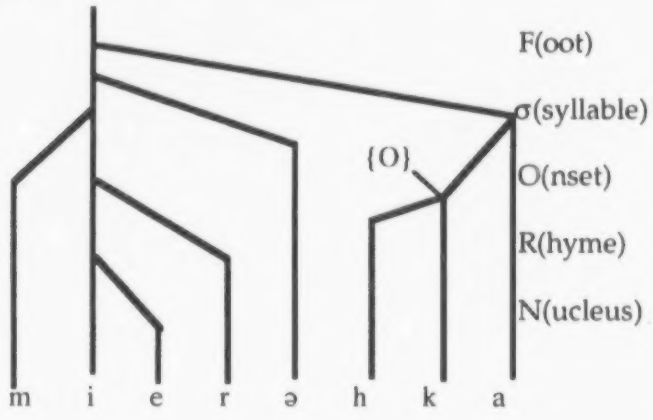
The direction of application is simply reversed to manifest the Saami system:

(6)

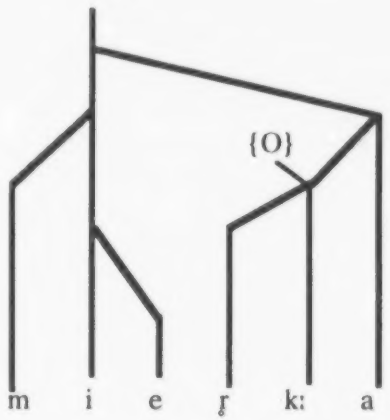


Underlying pre-aspirated plosives contain the {O} component, whereas non-aspirated plosives lack this component due to their proper phonological inventories given in (3). Given the underlying representation for the plosives in (3) and (6), the following examples characterize the process of devoicing in (1). In the following examples, I have assumed schwa to be dependent on the governing syllable. This step has been taken because, at present, there is not a clear understanding of the epenthetic vowel's position in grammar (see Nielsen, 1926; Bergsland, 1961; Lorentz, 1991).

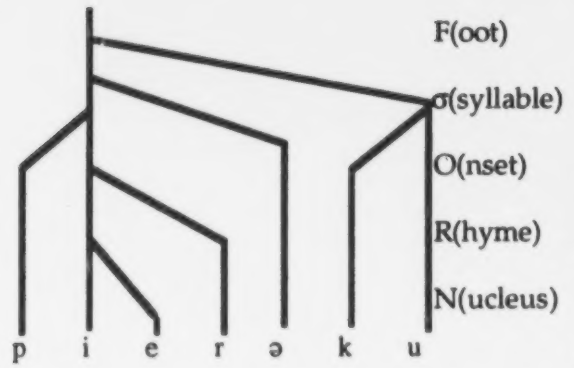
(7)



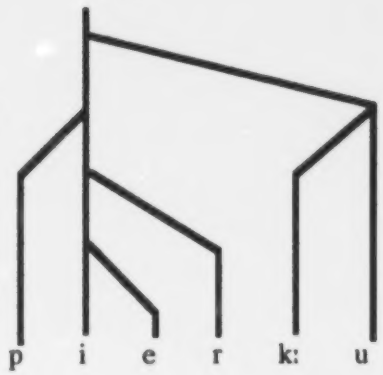
(8)



(9)



(10)



2. Fricatives

In terms of DP, the fricatives establish a mutual dependency between the |V| and |C| components because

> *Acoustically, we find in the production of a fricative attenuation of the consonantal reduction of energy as compared with the optimal stop consonant. Fricatives are therefore less |C|-like than their corresponding stops. (Anderson and Ewen, 1987: 153)*

Voiced fricatives, however, differ from their voiceless counterparts in having |V| in dependent position. This is due to the fact that,

> *Voiced phonemes are characterized by the superposition of a harmonic sound source upon the noise source of the voiceless phonemes. Voicing, then, increases, the periodicity of the consonant, by virtue of the addition of the harmonic source, vocal cord vibration. (Anderson and Ewen, 1987: 154)*

Thus, the voiceless fricatives will be represented as {|V:C|} and the voiced fricatives as {|V:C;V|} in their articulatory gesture.

The entire phonetic inventory of fricatives in the Káráwjohka dialect are as follows:

(11)

inter-dental	labio-dental	alveolar	palato-alveolar	palatal	labial-velar	glottal
[θ]/[ð]	[f]/[v]	[s]	[ʃ]	[j]/[j̆]	[w]	[h]
/θ/ /ð/	/f/ /v/	/s/	/ʃ/	/j/		/h/

Since the fricatives [f],[v],[θ],[ð],[s], and [ʃ] form geminates in all three grades of consonantal gradation, each of these segments is phonologically realized. At

the surface, the glottal fricative /h/ is not found in geminates, but it surfaces in the onsets of stressed and extrametrical syllables. Here are a few examples (where . represents a syllable boundary):

(12)

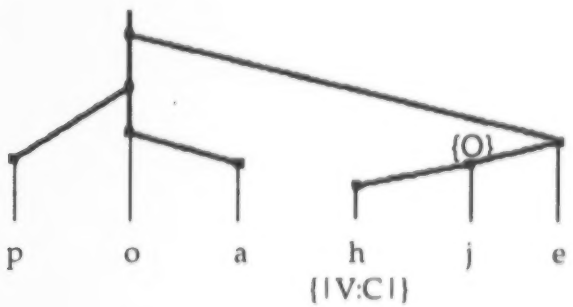
(i)	/**h**up:mat/	[**h**up:.maht]	*'to talk'*
(ii)	/pora:**h**it/	[po.ra:.**h**iht]	*'to feed/taste'*
(iii)	/a:nu**h**eatʃ:i:/	[a:.nu.**h**ie.tʃ:i:]	*'petitioner'*

As Korhonen (1981) states, the palatal /j/ can be phonetically realized as either voiced or unvoiced:

> *An unusual phenomenon is the devoiced pair in Saami [hj] which shows up in the consonant gradation of new words, e.g. [poahj̊e] from the Finnish word, [pohja] 'base'. (Korhonen, 1981, 164)*

This process cited by Korhonen (1981) is also governed by the rule of devoicing in (6) even though the underlying segment is not a preaspirated palatal fricative, /hj̊/. Unlike the preaspirated plosives in (1c.i), [hj̊] does not change in quantity and is not subject to consonant gradation. So, devoicing is a consequence of assimilation within the articulatory gestures of /h/ and /j/. Underlyingly, /j/ is characterized as {|V:C;V|}, but an assimilation within the articulatory gesture of /h/ ({|V:C|}) will cause /j/ to loose its dependent {|V|}. This process of assimilation functions in the following way:

(13)



Additionally, [w] and [v] are in phonetic opposition due to the fact that [v] is found only in onsets and [w] only in rhymes. Here are a few examples:

(14)

(i)	/lovi:/	[lovij]	*'law'*
(ii)	/veæhkehit/	[veæhkehiht]	*'to help'*
(iii)	/kievneseæhkæ/	[kewneseæhkæ]	*'a sack for a pan'*

Rather than claiming [w] to be underlying, there is more phonological evidence to believe that /v/ is in the underlying segment. [w] patterns with the rhymes in word final position. Word finally, rhymes must contain a segment with the categorical gesture {|1|} in governing position ([r],[l],[n],[s],[ʃ], or [t])-i.e., [w]

({|l;u|}) will surface whenever a governing {|1|} is required by the internal structure of the language.

In concluding this section, the following categorical gestures are needed in order to classify the underlying fricatives:

(15)

inter-dental	labio-dental	alveolar	palato-alveolar	palatal	labial-velar	glottal
{|l,d|}	{|u,d|}	{|1|}	{|l,i|}	{|l;l,i|}	—	—

3. Affricates

The phonetic inventory for the affricates of the Káráwjohka dialect are often transcribed as: [tʃ], [dʒ], [hdʒ], and [htʃ]. But, Bergsland's comments on the orthographic system(1961,1-3) and the internal structure of the affricates gives evidence for the following transcriptions:

(16)

[htʃ]	x	-	'tse' i innlyd med pust foran
[hts]	<	-	'tsje' i innlyd med pust foran
[tʃ]	c	-	'eds' nærmest dsj, ellers mer som tsj (men uten pust foran)
[ts]	z	-	'edsj' nærmest dsj, ellers mer som tsj (men uten pust foran)

All four of the affricates are realized both phonetically and phonemically. Preaspirated affricates are found in identical environments as preaspirated plosives and non-aspirated affricates are found in identical environments as the non-aspirated plosives. Liquids become devoiced when preceding a preaspirated affricate. The representation proposed for the preaspirated plosives in (6) is also applicable to the affricates.

(17)

(i)	/haːr:**htʃ**ij/	[haːrə**htʃ**iː]	*'step'*
	/haːr**htʃ**ːis/	[haːr**tʃ**ːis]	*'step'-loc.*
(ii)	/kaːr:**tʃ**j/	[kaːrə**tʃ**iː]	*'narrow'*
	/kaːr**tʃ**it/	[kaːr**tʃ**ːiht]	*'more narrow'*

In (17), the short liquid becomes devoiced because it precedes an underlying preaspirated segment. So, [htʃ] and [hts] will underlyingly possess the component {O} whereas [dz] and [ts] will not possess such a property.

It is apparent that the affricates and the plosives will have similar representations. Unlike plosives, affricates have double articulation. Therefore, it seems productive to preserve the characteristics of both the plosives and the fricatives within structural representations for the affricates.

There has been a good deal of controversy pertaining to the representations for affricates (e.g., Davenport and Staun, 1986; Anderson and Ewen, 1987: 263-6; Anderson, 1986, etc). Most arguments revolve around:

(1) the Sonority Index, and
(2) the fact that most speakers perceive affricates as one segment rather than two.

DP notation may be able to restore both of these properties. Assuming the following to be true, a plosive would be forbidden to be dependent upon a fricative in the coda of a syllable:

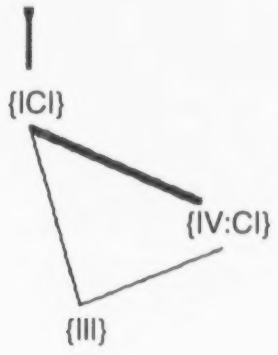
> *The dependency relation progresses regularly from the syllabic governor outwards; and that the more sonorant a segment, the lower its degree of dependency, i.e. more sonorant segments govern less sonorant segments. (Davenport and Staun, 1986: 136)*

This means that the fricative must be internally dependent on the plosive. Thus, I conclude that there must be at least two representations for the affricatives in the Káráwjohka dialect. The plosive must dominate the fricative in both cases.

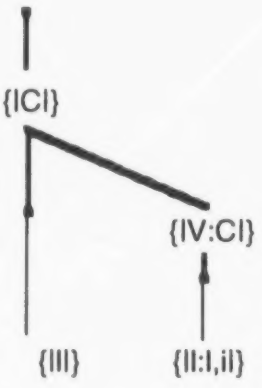
The first representation is illustrated in (18b). This characterizes the affricates [htʃ] and [tʃ]. Such a representation captures the lexical dependency relation and internally depicts the greater amount of sonorancy of {|C|} (i.e., sonority hierarchy). The categorical gesture ({|||} and {||;l,i|}) are directly connected to their respective nodes in (18b).

The second representation is formulated by further constraining (18b), which is a representation for the homorganic affricates [hts] and [ts]. Anderson and Ewen (1987) suggest an "intrasegmental adjunction of one categorical representation to another" for homorganic segments. Since [t] and [s] share the categorical gesture {|||}, this will be used to represent the intrasegmental adjunction.

(18a)

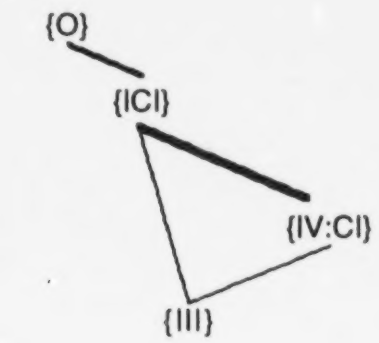


(18b)

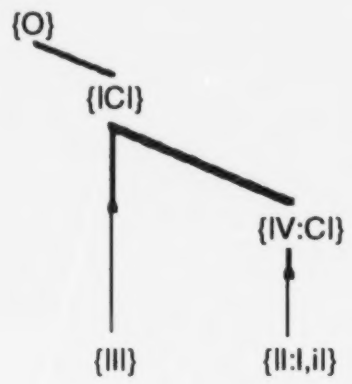


Both of these representations are further constrained to represent the preaspirated affricates. As in (6), {O} dominates the segment in order to account for the process of devoicing.

(19a)



(19b)



4. Nasals

Nasals are the first of the segments studied in which the |V| component preponderates |C|. In this case, |C| is assymmetrically dependent upon |V|, {|V;C|}. Traditionally, it has been agreed upon that the phonetic inventory of Saami contains four nasals ([m], [n],[ŋ] and [ŋ]), three of which are phonemically distinctive (/m/, /n/ and /ŋ/). All three phonemes form geminates of all three grades. Furthermore, [m], [n], [ɲ] and [ŋ] are all found in geminates and consonant clusters. The palatal, [ɲ], is post-lexically generated when preceding [j].

The nasals /m/ and /n/ have the property of devoicing when proceeding the glottal fricative /h/. It is poosible that /hm/ and /hn/ could be considered in the phonemic inventory:

(20)

/tui:**h:m**i:/	[tuij**h:m**i:]	*'dumb'*
/tui:**hm:**it/	[tuij**hm:**iht]	*'dumb'-pl.*
/tʃa:ij**h:n**ij/	[tʃa:ij**h:n**i:]	*'woodpecker'*
/tʃa:ij**hn:**it/	[tʃa:ij**hn:**iht]	*'woodpeckers'*

But, the preaspirated nasals share only two of the three quantity relations with the preaspirated plosives within geminates.

(21)

/hm/	/hn/	/hp/
[h:m̥]	[h:n̥] (20)	[h:p] (1c.i)
[hm̥:]	[hn̥:]	[hp:]
–	–	[hp]

Instead, a nasal (either /m/ or /n/) is subject to assimilation in its categorical gesture when proceeding a glottal fricative /h/. This process of devoicing is identical to (13) where a segment looses its dependent {|V|}.

The following is an underlying representation of the categorical gestures found for the nasals:

(22)

bilabial	alveolar	palatal	velar
{|u,n|}	{|l,n|}	{|l,i,n|}	{|l,u,n|}

5. Liquids/Laterals

The laterals are characterized in the articulatory gesture as {|V;V,C|}. Anderson and Ewen (1987) support this representation by asserting the following:

> *In acoustic terms, liquids are more |V|-like and less |C|-like than nasals. (1987,152) Liquids may form a natural class with fricatives in phonological processes, as opposed to nasals and stops. (Anderson and Ewen, 1987: 155)*

A lateral is phonetically realized as a palatal [ʎ] when the proceeding segment is a palatal fricative, [j]. Thus, the only relevant component within the categorical gesture will be the underlying component {|l|}, which denotes the alveolar /l/.

The trill, /r/, is found in all three quantitative grades in geminates: [r:r], [r:] and [r]. /r/ and /l/ pattern with the devoiced palatal fricative and the devoiced nasals such that these liquids become devoiced when proceeding the glottal fricative, /h/ in a consonant cluster. This combination of glottal fricative and a liquid is found in all three grades of consonant gradation. Due to this factor, these segments are to be included in the underlying phonemic inventory as /hr/ and /hl/. Here are a few examples:

(23)

/tʃuhl:i:/	[tʃuḥḽ:i:]	*'mumbling'*
/tʃuhl:at/	[tʃuḥḽ:aht]	*'to mumble'*
/tʃuhlaij/	[tʃuḥḽai:]	*'(s)he mumbled'*
/skuhr:ij/	[skuḥr̥:i:]	*'snoring'*
/skuhr:at/	[skuḥr̥:aht]	*'to snore'*
/skuhraij/	[skuḥr̥ai:]	*'(s)he snored'*

Preaspirated liquids will enter into the underlying representation in (6) and the governing {O} component will justify the devoicing of the liquid. The proper underlying articulatory gestures will be: {O};{|V:C;V|} for the preaspirated liquid and {|O|};{|C:V:C|} for the preaspirated trill.

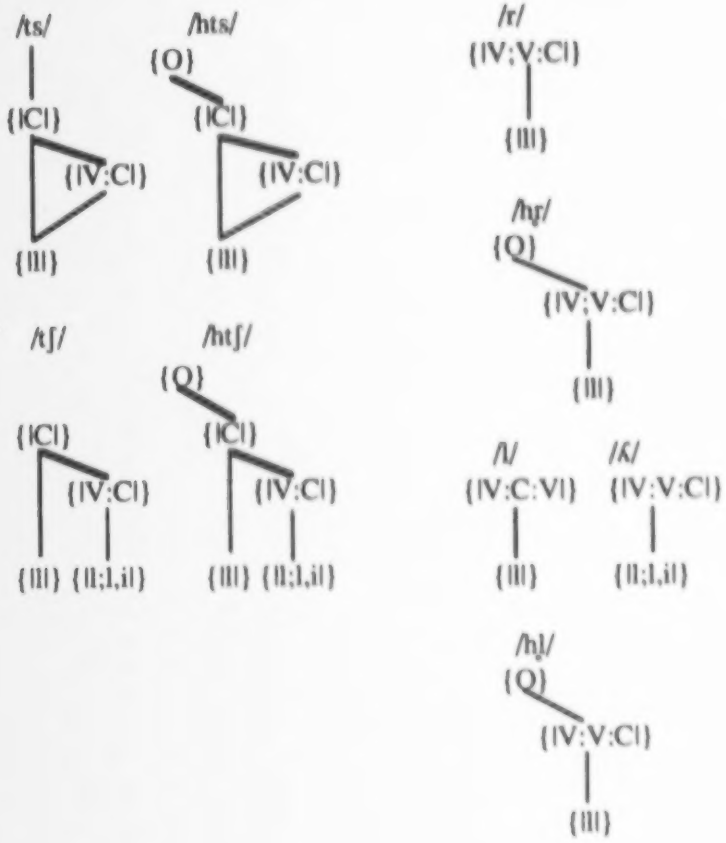
6. Summary

This concludes the phonemic inventory of the Káráwjohka dialect. The representation in (6) is just one demonstration depicting the predictability of the DP framework. By optimizing recurrent and natural phonological relationships, DP generates normal relationships which linear phonological frameworks have only achieved with a string of rules. The representation governing devoicing has far reaching effects within the consonant cluster and it can applied to all the consonants in Saami - plosives, fricatives, nasals, and liquids.

7. Phonemic Inventory

The following is the phonemic inventory as defined by this section in terms of DP.

/m/
{|V;C|}
{|u,n|}
/n/
{|V;C|}
{|l,n|}
/ŋ/
{|V;C|}
{|l,u,n|}
/p/
{|C|},{O}
{|u|}
/t/
{|C|},{O}
{|l|}
/k/
{|C|},{O}
{|l,u|}
/ʔ/
{|C|;}
/hp/
{O}
{|C|}
{|u|}
/ht/
{O}
{|C|}
{|l|}
/hk/
{O}
{|C|}
{|l,u|}
/f/
{|V:C|}
{|u,d|}
/θ/
{|V:C|}
{|l,d|}
/s/
{|V:C|}
{|l|}
/ʃ/
{|V:C|}
{|l;I,i|}
/h/
{|V:C|}
/v/
{|V:C;V|}
{|u,d|}
/ð/
{|V:C;V|}
{|l,d|}
/j/
{|V:C;V|}
{|l,i|}


/ts/
{ICl}
{IV:Cl}
{III}
/hts/
{O}
{ICl}
{IV:Cl}
{III}
/ʧ/
{IV;V:Cl}
{III}
/hʃ/
{O}
{IV;V:Cl}
{III}
/tʃ/
{ICl}
{IV:Cl}
{III} {II;1,il}
/htʃ/
{O}
{ICl}
{IV:Cl}
{III} {II;1,il}
/ɲ/
{IV:C:Vl}
{III}
/ʎ/
{IV:V:Cl}
{II;1,il}
/hʝ/
{O}
{IV:V:Cl}
{III}

Chapter II: THE VOWELS

1. Inventory

On the surface, the Káráwjohka dialect exhibits five diphthongs and six monophthongs. These are represented in the following manner:

(1)

DIPHTHONGS		MONOPHTHONGS	
[ie] li i;al	[uo] lu u;al	[i] lil	[u] lul
[ue] lu,i i;al	[oa] lu;a al	[e] li;al	[o] lol
[eæ] li;a a;il		[æ] la;il	
		[a] lal	

All the above vowels are present underlyingly, with exception to [ue]. Schwa [ə] should also be included in the phonetic inventory of vowels. A constraint can be put on the phonetically realized schwa.

2. Generalizations

This section pertains to a few generalizations, which can be made about the Saami vowel system and its interaction with phonological rules. These generalizations will be further constrained in the following sections of this chapter.

(2)

Schwa-insertion rule Schwa will be phonetically realized iff:

(i) There is a long underlying segment such that

(a) there is either a dependency or a governing relation between lVl and lV:Cl; and

(b) no component is in a dependent or governing relation with ll|; and

(ii) There is a short underlying segment {C} which proceeds an underlying segment meeting the requirements in (i).

This constrains schwa insertion in the following phonemic environments:

$$\emptyset \text{ ---> } \text{ə} \; / \; \begin{matrix} \text{ð:} \\ \text{r:} \\ \text{l:} \end{matrix} \; __ \; \{C\}$$

Since schwa is a consequence of the underlying structure of a lexical item, it does not have an underlying representation. Due to its predictability and its lack of articulatory specification, it is represented by {lVl}.

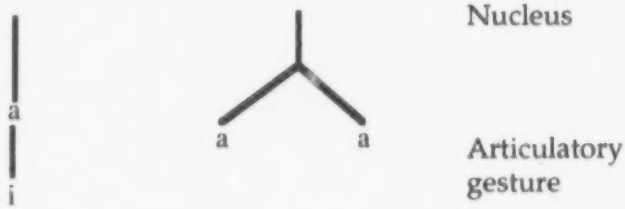
All monophthongs, with exception to |a;i|, are found on the surface either as short or long segments. A few generalizations pertaining to the vowels can be stated as such:

> **Generalization 1** If |a| is ever in a governing position to another component, as in |a;i|, this segment will be short underlyingly.

This generalization may be expanded to say:

> **Generalization 2** If any component |i|, |u|, or |a| is a governor, then the segment will be short in its underlying representation. The corresponding long vowel will be the governing component of the short segment. This is illustrated by the following representation:

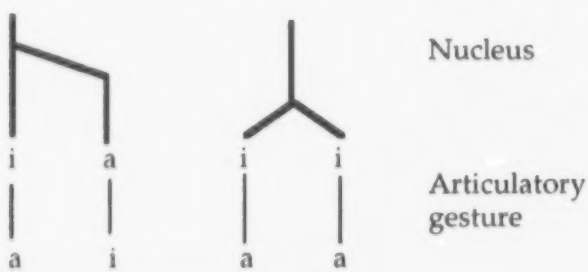
(3)



Generalization 2 can constrain the process of monophthongization:

> **Generalization 3** The first segment of a diphthong will govern the second segment since monophthongization preserves the first segment. The quantity of the diphthong is preserved and mutual intrasegmental dependency is established.

(4)



Based upon the latter two generalizations, a comprehensive study of five morphological phenomena having phonological impacts on the language will be observed--vowel variation, vowel mutation, monophthongization, vowel inflection, and diphthong harmony. Since vowel variation and vowel mutation cause monophthongization, I will begin by clarifying these three phenomena. Then, the process(es) governing vowel inflection and diphthong harmony will be observed.

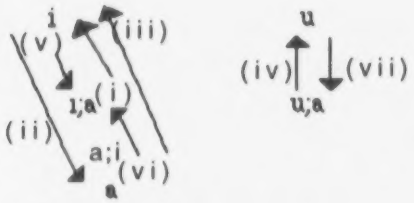
3. Vowel Variation

Nickel (1990) has defined vowel variation in the following manner:

> *i visse bøyningsformer veksler vokalen i trykksvak stavelse (på samme måte skifte vokalen foran visse avledningsendelser (Nickel, 1990: 22)).*[1]

In (5), I have listed the possible vowel variations and given an example of each variation.

(5)



(i)	/paste/+/ijte/	[pasti:ðe]	*'spoon'-ill.pl*	i;a i
(ii)	/a:htʃi:/+/ij/	[a:htʃa:i]	*'father'-ill.sg*	i a
(iii)	/kieht**a**/+/ij/	[ki:hti:]	*'hand'-ill.sg.*	a;i i
(iv)	/reŋ:k**o**/+/ij/	[reŋ:k**ui**:]	*'stool'-ill.sg.*	u;a u
(v)	/keæs:**i**/+/et/	[ke:s:**e**ht]	*'to pull'-3.p.pl.pres.*	i i;a
(vi)	/par:k**a**:/+/et/	[parəkeht]	*'to work'-3.p.pl.pres.*	a i;a
(vii)	/koar:**u**/+/ot/	[ko:r:**o**ht]	*'to carry'-3.p.pl.pres.*	u u;a

In (5i-iv), it appears that raising or lowering to one of the basic components (|i|, |u|, and |a|) occurs as a consequence of the inflectional suffix /ij/. Otherwise, the variations |i|-->| i;a|, |u|-->|u;a| and |a| ---> |i;a| are consequences of other inflectional suffixes.

4. Vowel Mutation

Vowel mutation is closely related to vowel variation since both (can) cause monophthongization. Vowel mutation is described by Lorentz (1992) as:

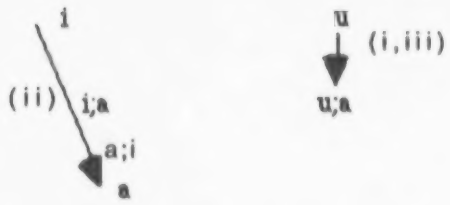
> **Latusomlyd (i/á - u/o skifte)**
> *Vokalskifte i latus (andre stavelse) betinget av visse affikser (notes, 1992)*[2]

(6)

---

[1] Under certain conditions, the vowel of some inflectional affixes occurring in unstressed syllables must be altered.

[2] This vowel shift is dependent upon a vowel, which occurs as a constituent of an affix in the second syllable in latus.



(i)	[puots**u**]	*'reindeer'*	[po:h:ts**o**]	*'reindeer'-gen/acc.sg.*	u	u;a
(ii)	[fa:l**i**s]	*'whale'*	[fa:l:l**a**:]	*'whale'-gen/acc.sg.*	a	i
(iii)	[kiel**u**]	*'clot'-nom.*	[ki:l:**o**ma]	*'clot'-gen/acc.sg.*	u	u;a

Vowel mutation is characteristic of the contracted and the odd-syllable lexical items. In Saami, three classes of words are found based upon the behavior of their roots: (1) even-syllable (likestavelses), (2) odd-syllable (ulikestavelses), and (3) contracted (sammendradde) words. Additionally, there are words which are not subject to consonant gradation. The roots of the even-syllable nouns are in nom. sg. case and the roots of the odd syllable as well as the contracted nouns are in acc/gen. sg. case. Vowel mutation should then be redefined as |u;a|---> |u| and |a| ---> |i|.

5. Monophthongization

Nickel (1990) describes monophthongization as:

> *Hvis vokal i trykksvak stavelse veksler til e eller o, bevirker denne vokalvekslingen som regel at en diftong i den forutgående stavelsen blir til enkeltvokal. Bare første del av diftongen blir igjen. (1990,24)*[3]

Nickel (1990) sites a few examples of monophthongization, but he opts for abstract representations. For instance, he assumes /kiehte/+/ij/ and /poallo/+/ij/ to be the underlying forms for (ii) and (iv). However, concrete representations will be incorporated into all instances of this study.

(7)

(i)	[ke:s:iht]	*'to pull'*	/kes:ij/+/eht/	[ke:s:**e**ht]	*3.p.pl.pres.*
(ii)	[kiehta]	*'hand'*	/kiehta/+/ij/	[ki:ht**i**:]	*ill. sg.*
(iii)	[koar:uht]	*'to sew'*	/koar:u/+/oht/	[ko:r:**o**ht]	*3.p.pl.pres.*
(iv)	[poal:u]	*'button'*	/poal:u:/+/ij/	[pol:**ui**]	*ill.sg.*

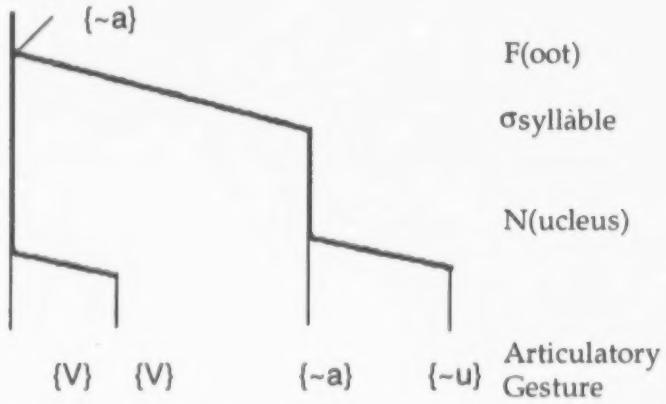
Nickel's (1990) explanation of monophthongization only manages to explain the nature of (i) and (iii) if a concrete phonemic analysis is incorporated. If the rule for monophthongization is expanded to include [i:]

---

[3]If a vowel changes to either e or o in an unstressed syllable, this vowel change will generally cause a diphthong in the previous syllable to become a single vowel. Thus, only the first member of the diphthong will then remain.

and [ui:], as well as [e] and [o], then monophthong-ization becomes more predictable. For instance, if |i| or |u| (equally, {~a}) immediately govern either |i| or |a| (equally, {~u}), such that |i| or |a| are included in an inflectional affix, then monophthongization will occur. The DP representation governing monophthongization will look like this:

(8)



Monophthongization of the vowel variations in (5) and the vowel mutations in (6) are accounted for by incorporating {~a} as the underlying component at word level. Therefore, monophthong-ization can now be defined on the basis of a concrete phonemic structure:

(9)

monophthongization
(i)monophthongization will occur as a consequence of an inflectional suffix such that {~a} governs {~u}; and
(ii){~u} is contained in the inflectional affix and both {~a} and {~u} are segments of an unstressed syllable.

Consider the following paradigms in (10):

(10)

	(i) 'fish'	*(ii) 'skier'*	*(iii)'reindeercalf'*	*(iv)'cloudberry'*
nom. sg.	[kuol:i:]	[tʃuoijhki:]	[mies:i:]	**[luomi:]**
gen/acc sg.	[kuoli:]	-----	[miesi:]	[luoʔpma:na]
ill. sg.	**[kuol:ai:]**	[tʃuoijhkai]	**[mi:s:i:]**	[luoʔpma:ni:]
ill. pl.	[ku:li:ðe]	[tʃ**uoijhki:ðe**] or [tʃ**u:ihki:ðe**]	[mi:s:i:ðe]	[luoʔpma:i:ðe]

Monophthongization will not take place in the ill. sg. forms of (i-iii) because the component {|a|}, rather than {|i|} or {|u|} is in governing position. But, first a few questions must be answered before proceeding:

(1) Why is (i) subject to a different inflectional paradigm than (iii) in ill. sg?
(2) Why is there an ambiguous treatment of the ill.pl. in (ii)?
(3) Why does monophthongization not occur in the nom. sg. of (iv), though its root is in the gen/acc?
(4) Why does monophthongization not occur in the gen/acc forms of (i) and (iii), though the roots are in the nom. sg. case.?

The answer to the first question lies in the historical processes of Saami. The case system is etymologically older than the monophthongs. An opposition has thus come into existence. Here are the historical processes for both lexical items:

(11)

case system already in existence				diphthongs come into existence
**[ka:la:]	—>	*[ko:le:]	—>	[kuol:i]
**[me:se]	—>	*[me:se]	—>	[mies:i]

Since the case system was already in use from the beginning of this historical representation, (i) would have been [ka:la:ij] and (ii), [me:si:] in ill. sg. case. In the second stage of development, the vowel shift **a: ---> *e: would have produced today's opposition-i.e., ill.sg. would have retained [a:ij], whereas the other cases (all of which were proceeded by an alveolar), merged with the paradigm of (10ii). This yields a solution from a diachronic outlook. Synchronically, even-syllable paradigms resulting in ill.sg. of the type in (10iii) are extremely rare and considered marked.

There is evidence to believe that a consonant cluster/ geminate must be strong in order to license monophthongization. But, this statement contradicts the unmarked situation in ill.pl. of (10i), whereas the marked case in (10iii) follows this process. I propose that lexical items behaving like (10i) should be given the term i#even-syllable lexical items. As will become obvious in this section, the i#even-syllable lexical items are not governed by {~a}.

The case of the ill.pl. in (10ii) presents an ambiguity in the paradigm. This opposition arises because the native speaker has a tendency to monophthongize a diphthong when in the environment defined by (8) and (9) as well as the consonant cluster/geminate is strong. Yet, the speaker is confronted with the ill. pl. case, which generally requires a weak consonant cluster/geminate and, consequently, tends to block monophthongization (note that (10ii) is a noun that does not undergo consonant gradation). This is seen in (10iv) where [luo?pma:na] is the root and monothongization is blocked since the consonant cluster is weak. It could be stated more productively that the gen/acc.sg. case of even-syllable lexical items are not subject to (8) and (9) since no inflectional affix is present. Consonantal gradation is not sufficient for monophthongization to take place. Monophthongization can not apply to (10iv) because odd-syllable and contracted lexical items ((10iv) and (6ii), respectively) were historically of the even-syllable type.

So far, the i#even-syllable lexical items are opaque to monophthongization governed. I suggest that the contracted and odd-syllable lexical items pattern with the i#even-syllable words with the following vowel shifts are not subject to {~a} at word level:

(12)

i:	~	a	(9i)
a	~	i:	(5ii),(9iv)

These lexical items will be governed by a different set of rules. But, this paper is concerned with the underlying {~a} and I will not give any further attention to the underlying phonological structure for lexical items patterning with (12).

6. Vowel Inflection and Monophthongization

So far, the instances given in (12) are the only exceptions to (9), but vowel inflection is also opaque to monophthongization. But, vowel inflection will not induce monophthongization even though an unstressed syllable contains a segment {~a;a}. In addition, as will be obvious from (14), diphthong harmony is a consequence of vowel inflection, but not of vowel variation and vowel mutation. Nickel (1990) defines vowel inflection as:

> *en lang vokal i trykklett stavelse som følger direkte etter en trykksterk stavelse blir i visse tilfelle forkortet (Nickel, 1990: 23)*[4]

And Korhonen (1988, 47) writes:

> *The shortened or allegro vowels (e,o,a) are phonologically problematical. They are found in the head words of postpositions, in the first element of compound words, in some particles, in some often repeated words, etc.*

The three inflections involved are:

(13)

i	--->	i;a
u	--->	u;a
a	--->	a;i

The following paragraphs show that vowel inflection does not oppose the other vowel shifts mentioned above as previous phonologists have claimed. (Sammallahti 1971,1984; Korhonen 1981,1988; Bergsland 1965, etc) Phonologically, vowel inflection is also governed by the rule of monophthongization. This allows vowel variation, vowel mutation, vowel inflection, and monophthongization to collapse into one phonological rule governed by {~a}.

---

[4] A long vowel in an unstressed syllable, which appears directly after a stressed syllable is often reduced.

Vowel inflection is often characterized in terms of shortening. In addition to Korhonen's (1981) suggestions, shortening is found in second person imperative, compound words, infinitives in rapid speech, and some numbers ending in a shortened (allegro) vowel are not subject to monophthongization. Here are a few examples:

(14)

(i)	/iehtiht/	[tehteht]	*'to know' (rapid speech)*
(ii)	/kuol:ij/+/mæl:li/	[kuel:əmæl:li]	*'fishsoup'(compound word)*
(iii)	/tʃuerəvuht/	[tʃuerv:o]	*'yell!' (2.p.sg.imperative)*
(iv)	---	[kuehk:te]	*'two' (number)*
(v)	---	[melde]	*'with' (postprep.)*
(vi)		[uol:e]	*'quite' (particle)*

If the rule for monophthongization is made accessible to vowel inflection, this is more evidence for retaining (9). If one of the components of TONALITY (|i| or |u|) must immediately govern {~u} or {a} in an inflectional affix, then every possibility but (13iii) is ruled out since there is no inflectional affix attached to any of the other instances. Then, there is enough support to state that a consonant cluster/geminate of grade III is not subject to the rule of monophthongization. The revised rule is stated as:

(15)

monophthongization
(i) monophthongization will occur as a consequence of an inflectional suffix such that {~a} governs {~u}; and
(ii) {~u} is contained in the inflectional affix and both {~a} and {~u} are segments of an unstressed syllable; and
(iii) A weak consonant cluster\geminate is opaque to monophthongization

However, the potential verbs seem to entirely contradict this rule of monophthongization. Consider the following:

(16)

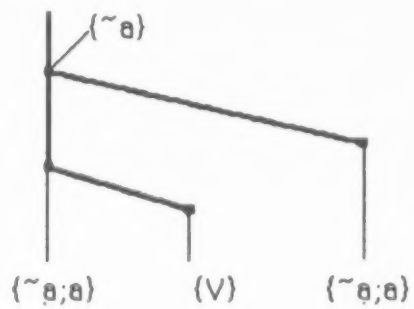
[poahtiht] *'to come'*	[tʃuerəvuht] *'to yell'*
[po:ðeʃan]	[tʃurv:oʃan]
[po:ðeʃaht]	[tʃurv:oʃaht]
[po:ðeʃa], [po:ðeʃ]	[tʃurvɬ:ʃa], [tʃurv:oʃ]
[po:ðeʃehtne]	[tʃurv:oʃehtne]
[po:ðeʃeah:pi]	[tʃurv:oʃeah:pi]
[po:ðeʃeapa]	[tʃurv:oʃeapa]
[po:ðeʃiht]	[tʃurv:oʃiht]
[po:ðeʃeahpeht]	[tʃurv:oʃehpeht]
[po:ðeʃiht]	[tʃurv:oʃiht]

Instead of stating the potentials as an exception to monophthongization, the underlying forms of the above verbs are /poːðeʃiht/ and /tʃurvːoʃiht/, respectively. These underlying forms are stored in the lexicon and will not be subject to the rule of (15). Note that the same procedure can also be applied to the conditional. In this case, /poaðaːʃiht/ and /tʃuːrvːoʃiht/ are the words embedded in the lexicon. The only problem facing the rule stated in (15) is the 3.p.sg.pret. of the i#even-syllable verb (i.e. [poːðiː] '(s)he came'), but this will be governed by the set of rules in (12).

7. Diphthong Harmony

The following rules will apply to the diphthongs according to Eira's data (1985, 23) and the underlying {~a} component:

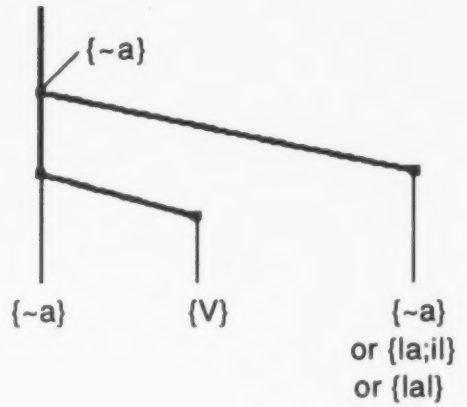
(17)



(i) [k**oa**ro] *'not sew' neg. pres.*
(ii) [v**ue**tːeht] *'they win' 3.p.pl.pres.*
(iii) [k**eæ**sːeht] *'every summer'*

/ie/	[e]	i i;a	i;a
/eæ/		i;a a;i	
/uo/	[ue]	u u;a	u,i i;a
/oa/		u;a a	

(18)



(i) [**kuol**:i] *'fish'*
(ii) [**mie** si] *'reindeercalf'-gen\acc.sg.*

/ie/ i i;a
/uo/ u u;a

I will define this phonological process diphthong harmony, where the vowel height of the first element of a diphthong and the vowel in the unstressed syllable must be equal. The component {~a} is phonologically underlying at word level. As before, (e.g., (11)), {a} is opaque to rules governing {~a}.

(19)

Diphthong harmony
(i)If the governing component of the vowel in an unstressed syllable is {~a} and its dependent {a} and the consonant cluster\geminate is not of grade III, then (16) will be applicable.
(ii) If the vowel in an unstressed syllable is {~a} and the consonant cluster\geminate is not of grade III, then (17) will be applicable.
(iii) If the consonant cluster\geminate is of grade III, then (16) is applicable.

Consider the consequences of (19iii):

(20)

(i)	/**hie**r:ki:/	[h**eæ**rəki:]	*'reindeer bull'*
(ii)	/**pie**r:ku:/	[p**e**rəku:]	*'meat'*
(iii)	/**pie**s:sij/+/pi:h:ta/	[p**eæ**s:s**e**pijh:ta]	
(iv)	/**luo**n:tu:/	[**luo**n:tu:]	*'nature'*
(v)	/**luo**nt:u:/	[**luo**nt:u:]	*'nature'gen\acc.sg.*
(vi)	/**poa**h:tsu:/	[**poa**h:tsu:]	*'reindeer'-sg.*
(vii)	/**tie**h:tit/	[**tie**h:tiht]	*'to know'*
(viii)	/**puo**h:tij/	[puoh:ti:]	*'come'-2.p.du.*

Though the geminate in (iii) is of grade III, the process of shortening manifests itself in compound words. Since the vowel in the unstressed syllable is e* |i;a| (equally, {~a;a}), (iii) is subject to (19i). Likewise, (i), (ii), (iv), and (vi) have consonant clusters/geminates of grade III. But, because shortening is not applied, (19iii) govern the diphthongs. (v), as opposed to (iv), is of grade II and the vowel of the unstressed syllable is [u], |u| (equally, {~a}), so the lexical item is governed by (19ii) Though (vii) and (viii) are of grade III, neither conforms to the rule in (19iii). This is due to the underlying segment in the consonant cluster without an articulatory gesture, /h/. If a lexical item contains /h/ in its consonantal cluster in the underlying form, then the lexical item will not be subject to (19iii), but to either (18i) or (18ii). This is plausible since words such as [leæijhkuht] *'stern boards'* and [heæijhtiht] *'to quit'* (/leæi:kut/ and /heæih:tit/) do not include /h/ in their underlying forms and conform to (18iii).

Diphthong harmony, like monophthongization, functions at word level. With further research, these rules may surely be simplified. Nevertheless, here is the final rule for diphthong harmony based upon Eira's article:

(21)

Diphthong Harmony

(i) (17) will be applicable if the governing component of the vowel in an unstressed syllable is {~a}; and

(a) the consonant cluster\geminate is not of grade III, or

(b) the consonant cluster\geminate is of grade III and epenthesis or shortening has already taken place.

(ii) (18) will be applicable if the governing vowel in an unstressed syllable is {~a}; and

(a) the consonant cluster\geminate is not of grade III, or

(b) the consonant cluster\geminate is of grade III and includes a segment without an articulatory gesture.

As the rule for monophthongization is opaque to the vowel shifts governed by {a} at word level (see (12)), it is also correct in predicting that {a} is opaque to diphthong harmony.

8. Summary

This section on vowels gives evidence for a reduction in the phonological rules of Káráwjohka dialect. Not only do the rules of monophthongization and diphthong harmony achieve more promising results than the former rules, but this is accomplished by introducing a concrete phonological representation. In respect to a DP representation, an underlying {~a} component at word level must inevitably be included. In conclusion,it can be said that more research should focus on this {~a} component in hopes for solving a (set of) rule(s) governing the underlying {a} component (see 11).

A special thanks should be extended to Curtis Rice, who helped me in preparing this paper. Any mistakes cited in this paper are those made by the author, myself. As I am sure there are many controversial analyses in this paper, I hope that this will at least shed some light on and spark some interest in the field of Saami phonology.

References

Anderson, John (1986) Suprasegmental Dependencies in Dependency and Non-Linear Phonoogy, Durand, Jacques (ed.), Croom Helm Ltd. (London).

Anderson, John (1987) The Limits of Linearity in Explorations in Dependency Phonology, Anderson, John and Jacques Durand (eds.), Foris Publications (Holland).

Anderson, John M. and Colin J. Ewen. (1987) Principles of Dependency Phonology, Cambridge University Press (London).

Bergsland, Knut (1961) Lærebok i Samisk. (Kirke- og Undervisnings-departementet).

Chomsky, Noam and Morris Halle (1968), The Sound Pattern of English, (Massachusettes: MIT Press).

Davenport, Mike and Jørgen Staun (1986), "Sequence, Segment and Configuration: Two Problems for Dependency Phonology", in Dependency and Non-Linear Phonology, Jacques Durand (ed.) , pp. 135-160.

Eira, John Henrik (1985) "Gáráwjoga suopmana diftoåggat", Diedu, Sámi Instituhtta (Kautokeino, Norway), pp. 13-23.

Hulst, Harry van der (1992) "The phonetic and phonological basis of the Simplex Feature Hypothesis", in Phonologica 1988: Proceedings of the 6th International Phonology Meeting, Dressler et al. (eds), (Cambridge University Press)

Jernsletten, Nils. Kárásjoga suopman. Davvisámegiela ja Divttasvuonasámegiela suopmanteavstat ja suopmankárttat. Dialektkompendium, samisk grunnfag, Univervisitetet i Tromsø (Tromsø, Norway), pp. 24-9.

Korhonen, Mikko (1981) Johdatus Lapin kielen historiaan. Suomalaisen Kirjallisuuden Seura (Helsinki).

Korhonen, Mikko (1988), "The Lapp Language", in The Uralic Languages, Denis Sinor (ed.), 41-57.

Lass, Roger (1987) Intradipthongal Dependencies in Explorations in Dependency Phonology, Anderson, John and Jacques Durand (eds.), Foris Publications (Holland).

Lorentz, Ove (1991), "Q3 in Lappish and Estonian" (unpublished ms). Presented at Sámi giellaseminára in Tromsø, Norway.

Lorentz, Ove (1992) Lecture notes from University of Tromsø (fall 1990-spring 1992).

Nielsen, Konrad (1926) Lappisk (samisk) ordbok. Universitetsforlaget.

Nikkel, Klaus P (1990) Samisk Grammatikk. (Universitetsforlaget).

Sammallahti, Pekka (1971), "Ehdotus norjanlapin länsimurteiden fonemaattiseksi transkriptioksi", Lapin murteiden fonologiaa: Castrenianumin toimitteita 1, 7-22.

Sammallahti, Pekka (1977), "Norjansaamen Itä-Enontekiön murteen äänneoppi", Suomalais-ugrilaisen Seuran Toimituksia 160.

Sammallahti, Pekka (1984), "The Phonology of the Guovdageaidnu dialect of North Saami: Some Notes", Riepmocála (Essays in Honor of Knut Bergsland, 136-152.

Sammallahti, Pekka (1980) "Jietnadatoahppa: Fonetihka vuoddoawwit I", Diedu, Sámi Instituhtta (Kautokeino, Norway).

Sammallahti, Pekka (1989) Suoma-Sámi sátnegirji. Jorgaleaddji Oy (Ohcejohka, Finland).

Schane, S.A. (1984), "The Fundamentals of Particle Phonology", Phonology Yearbook 1, 129-55.

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